Research article

Psychological Stamina and Thinking Style Preferences among First-Year University Students

Henry Mason,* Ané Craven** & Megan Fredericks***

Abstract

This study investigated the association between psychological stamina (grit, mindset and hardiness) and thinking style preferences among South African university students. Data were collected from 369 first-year university students using measures of grit, mindset, hardiness and thinking style preferences. The results indicated that different thinking style preferences were related to grit, mindset and hardiness. We argue that thinking styles should be considered as an important variable when supporting first-year students. Additionally, the role of grit and hardiness in student success should be considered in conjunction with the thinking style preferences of students. Avenues for further research are considered.

Keywords

grit, hardiness, mindset, Neethling Brain Profile Instrument (NBI), thinking style preferences

Introduction

Student development and support (SDS) services promote holistic well-being among students in academic and personal areas (Mason, 2019; Sinclair, 2019). Well-being refers to two broad and interrelated aspects: satisfaction with life, and experiencing more positive than negative affect (Diener, 2013). Holistic well-being, or flourishing, points to a state of optimal functioning and encompasses emotional well-being (experiencing more positive than negative emotions), social well-being (positive relationships) and psychological well-being (purpose, meaning and personal growth) (Keyes, 2016).

Research has indicated that higher levels of well-being can help students approach their learning in more focused states that could culminate in upward cycles of engagement, and ultimately promote greater academic commitment, learning and student success (Fredrickson & Branigan, 2005; Mason, 2019; Van Zyl & Rothmann, 2012). Student success is a multidimensional concept that encompasses positive adjustment to the university context, academic performance and a sense of well-being (Cilliers, 2014; Sinclair, 2019).

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Well-being is conceptualized in one of two traditions: hedonic well-being (HWB) or eudaimonic well-being (EWB) (Diener, 2013). HWB refers to the pursuit of pleasure and the minimisation of pain, whereas EWB is more closely aligned to flourishing (Diener, 2013; Waterman et al., 2010). A central feature of well-being also entails the capacity to remain psychologically resilient in the face of stressors (Southwick et al., 2014). Resilience points to the capacity to deal with stressors in ways that promote positive adaptation and growth (Southwick et al., 2014). Numerous psychological variables, such as grit, mindset and hardiness, are closely related to resilience.

Grit, mindset and hardiness

Grit, which entails the capacity to pursue goals with passion and vigour, has been linked to enhanced academic performance and perseverance (Duckworth et al., 2007). Researchers have noted that mindset is closely related to grit (Dweck, 2016). According to Yeager and Walton (2011), mindset refers to the assumptions or implicit theories that people use as decision filters to attribute meaning to intelligence, personality and performance in various domains, one of which is university studies. These implicit theories shape people's perceptions of their capacities to change and engage in learning (Yeager & Walton, 2011). Dweck (2006) points to two sets of mindset: fixed mindset and growth mindset.

A fixed mindset describes the implicit theory that people have a predetermined range of skills, talents and abilities. In contrast, the growth mindset suggests that people can incrementally develop the skills required for academic success through purposeful effort (Blackwell et al., 2007). Students who hold fixed mindsets would interpret learning opportunities as stressful encounters that threaten their sense of psychological well-being. Conversely, growth mindset-orientated students would likely regard the learning process as a challenge that promotes flourishing (Yeager et al., 2013). Accordingly, students who exhibit a growth mindset are more likely to present higher grit levels (Duckworth, 2016; Dweck, 2016). Similarly, gritty students with growth mindsets are prone to present with hardiness (Maddi et al., 2012).

Hardiness, which describes a pattern of skills associated with the capacity to remain resilient in response to stressors (Maddi et al., 2009), comprises three interdependent factors, namely challenge (interpreting challenges as opportunities for growth), control (internal locus of control), and commitment (engagement in pursuing important life goals) (Maddi et al., 2012). Research has indicated that hardiness can be developed through hardiness training (Jameson, 2014; Maddi et al., 2009). Hardiness training adopts a cognitive-behavioural approach and focuses on assisting students in examining appraisals of stressors, thereby promoting adaptive coping and enhanced stress-management skills (Maddi et al., 2009; Sahranavard et al., 2019). As a result, autonomous functioning and adaptive coping strategies can be developed through hardiness training, thus positively affecting student success (Maddi et al., 2009).

Collectively, grit, mindset and hardiness refer to the optimistic interpretation of challenges as avenues towards flourishing and the accompanying tenacity required for goal

achievement despite functioning in a stressful environment (Dweck, 2012; Duckworth, 2016; Maddi et al., 2009). Thus, students who rate highly on measures of grit, mindset and hardiness are likely to present with the psychological stamina required to persist diligently during stressful periods (Achor, 2011; Anderson, 2016). In this paper, the umbrella term "psychological stamina" is used in reference to grit, mindset, and hardiness.

Theory on the constructs included in psychological stamina presupposes a linear and self-disciplined approach from students to pursuing and achieving academic success (Broghammer, 2017). In other words, research suggests that gritty students who adopt a growth mindset and present with higher levels of hardiness tend to be more academically successful (Duckworth, 2016; Dweck, 2012; Maddi et al., 2009). Consequently, it could be assumed that specific non-cognitive factors should be promoted and developed to promote student success (Anderson, 2016). Non-cognitive factors refer to the behaviours, skills, attitudes, and strategies that contribute, inter alia, to student success but are not traditionally assessed in the academic context (Nagaoka et al., 2013). Theorists on thinking style preferences argue that students can approach challenges from various perspectives (De Boer et al., 2013; Neethling, 2005). Therefore, a student's unique thinking preference may predispose them to report different levels of psychological stamina (Hermann & Hermann-Nehdi, 2015; Nagaoka et al., 2013). Accordingly, thinking style preference may fall within the ambit of non-cognitive factors and be related to psychological stamina. To date, limited research has investigated the relationship between psychological stamina and thinking style preferences.

Thinking style preferences

It would be simplistic to expect that, given the complexity of human nature, mediating factors might not play a role in either negating or supporting the practices associated with psychological stamina (De Boer et al., 2013). Thinking styles, which refer to preferred ways or patterns in which a person makes sense of the world, may offer a window into understanding individual differences related to psychological stamina (Hermann & Hermann-Nehdi, 2015).

Neethling (2005) identified four thinking styles, described as quadrants metaphorically linked to localised areas in the brain. The four metaphorical thinking style quadrants are graphically represented in Figure 1.

As illustrated in Figure 1, Quadrant 1 is also referred to as L1 and represents a logical, quantitatively orientated, critical, objective, analytical and fact-based thinking style (De Boer et al., 2013). Quadrant 2 (L2) represents a planning-based orientation and encompasses specific thinking processes that are sequential, controlled, structured, detailed, and procedural. Quadrant 3 (R1) is associated with long-term, strategic, explorative, and conceptual thinking preferences. The person who shows a strong inclination for R1 thinking would also be less risk-averse and may be likely to challenge the status quo. Finally, the R2 thinking style, indicated in Quadrant 4, is associated with a strong relational focus, and encompasses a preference for interpersonal cooperation and empathy (De Boer et al., 2013).

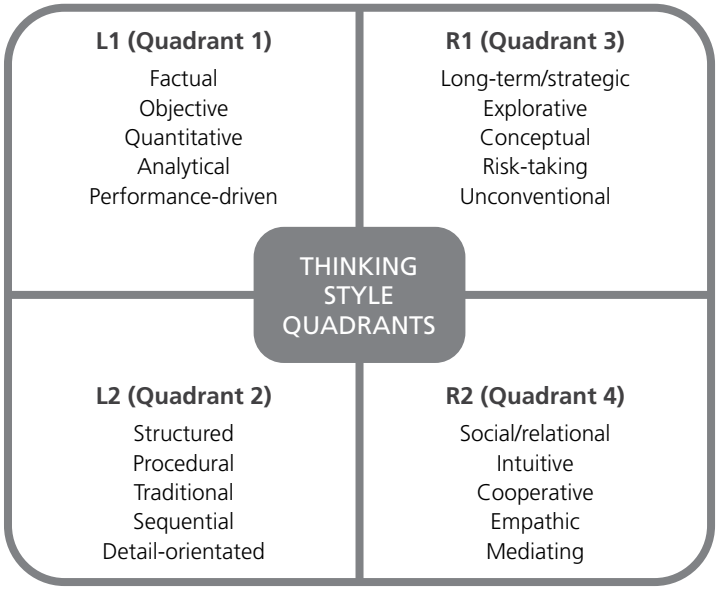

Figure 1: Thinking style quadrants (adapted from Neethling, 2005)

According to Neethling (2005), thinking style preferences influence decision-making, thus affecting how students understand academic challenges and engage with the world. Hence, students would be likely to approach their educational goals in ways commensurate with their thinking style preferences (De Boer et al., 2013; Herbst & Maree, 2008; Neethling, 2005). Additionally, we hypothesise that students' well-being profiles, including the elements described as psychological stamina, would be expressed uniquely based on students' preferred thinking styles.

Although some studies have explored thinking style preferences among students (De Boer et al., 2013; Herbst & Maree, 2008), limited research has investigated the relationship between thinking style preferences and well-being constructs such as psychological stamina. This is an important area to explore, especially among persons working in SDS roles. In addition, developing a better understanding of how psychological stamina manifests as a result of different thinking styles could offer the empirical grounding needed to deliver student-centred services (De Boer et al., 2013).

Student development and support

The massification of higher education in South Africa led to an influx of students into the university system (Scott, 2018). However, the widening of access to university did not result in the anticipated increase in student success (Cilliers, 2014; Lewin & Mawoyo, 2014). On the contrary, South African higher education is described as a high attrition and low success system (Wilson-Strydom, 2015). The need to augment physical access with student success has been well documented since (Scott, 2018; Wilson-Strydom, 2015).

SDS services have essential roles to play in promoting student success (Lewin & Mawoyo, 2014; Mason, 2019). One approach to delivering SDS services is using psychological assessments to pinpoint potential risk factors that could negatively affect student success (Dockrat, 2016; Foxcroft & Roodt, 2013). The purpose of psychological risk assessments is to identify areas where students that have gained access to higher education may require support (Seidman, 2005). Hence, based on the psychological assessment results, students could be referred to relevant SDS service areas such as career counselling, study skills intervention programmes, mentorship, or language support services (Dockrat, 2016; Lewin & Mawoyo, 2014).

Previous studies pointed to the importance of considering students' well-being and thinking style preferences in promoting student success (De Boer et al., 2013; Van Zyl & Rothmann, 2012). However, it is vital for staff responsible for conducting psychological assessments within SDS contexts to understand the relationship between well-being and thinking style preferences. Such an understanding could enhance the quality of data interpretation and promote accurate referrals to intervention services, which may ultimately augment physical access to university with student success (Dockrat, 2016; Scott, 2018).

The goal of the study

This study was aimed at investigating the relationship between thinking style preference and psychological stamina among a sample of first-year university students. The following research question guided the study: What is the empirical relationship between first-year students' thinking style preferences and psychological stamina?

Method

Research approach and strategy

A cross-sectional, descriptive, and correlational research design was used to investigate the relationship between thinking style preference and psychological stamina. The three constructs (grit, mindset, and hardiness) included under the umbrella term "psychological stamina" served as the dependent variables, and thinking styles served as the independent variable.

Participants and setting

A purposive sample of 369 first-year university students participated in the study. All the participants completed a psychological risk assessment when they enrolled for their academic studies. The risk assessment focused on assessing the students' well-being and thinking style profiles. Following the risk assessment, the students attended a developmental feedback workshop. Subsequently, based on the students' results, they were referred to specialist SDS services, for example, study skills intervention or language support programmes. Only limited biographical data, such as student numbers (identification number at the university), were collected from the students. Thus, no information is available on students' sex, age, or other biographical details.

Data collection and procedure

Data were collected pre-COVID-19 from February to March during the 2020 academic year. All participants were enrolled for academic studies at a South African university. The students completed measures of psychological stamina and thinking styles in a face-to-face format and received feedback on their results. All data were stored in an online archive and duly anonymised and de-identified. The Research Ethics Committee of the university where the sample was drawn granted permission to conduct the study (Ref#: REC2020/08/002), and all participants provided informed consent. The data collection instruments are described next.

Instruments

Psychological stamina was assessed using three instruments: the Dweck Mindset Instrument (DMI), the Grit Scale, and the Hardiness Scale. Thinking styles preferences were assessed using the Neethling Brain Profile Instrument (NBI).

The DMI is a 16-item measure that assesses how students view their intelligence (Dweck, 2016). Students rank their levels of agreement on a scale ranging from 1-6 (1 = strongly agree; 6 = strongly disagree). Examples of items include: "You have a certain amount of intelligence, and you can't really do much about it" and "No matter who you are, you can significantly change your level of talent." Scores are summed and averaged. The DMI serves as a valid and reliable measure of mindset (Dweck, 2008), and the internal reliability in this study was assessed as 0.71.

Consisting of 8 items, the Grit Scale features a 5-point scale (1 = not like me at all; 5 = very much like me) (Duckworth et al., 2007). Two examples of items are: "Setbacks don't discourage me" and "I finish whatever I begin." The literature reports excellent internal consistencies ranging from 0.77 to 0.90 (Duckworth & Quinn, 2009). The Cronbach's alpha of this study was calculated as 0.79.

The Hardiness Scale comprises 15 items and reports four scores: total hardiness, commitment, challenge, and control (Bartone, 2007). Students are instructed to respond to a series of statements using a 4-point Likert scale (0 = not at all like me; 3 = completely agree). Examples of items include: "By working hard you can nearly achieve all your goals" and "Life in general is boring for me." The Hardiness Scale presents with good internal consistency levels (Bartone, 2007) and the Cronbach's alpha of this study was calculated as 0.77.

The NBI is a self-report questionnaire that identifies an individual's thinking style preferences (Neethling, 2005). The NBI can be described as a conceptual model that offers a description of thinking styles. However, an implicit assumption of the NBI is that the richness of brain functioning cannot be assessed accurately nor depicted using a one-dimensional survey questionnaire. Consequently, the thinking style preferences are described using metaphorical vernacular referring to the four quadrants of the brain, namely two in the left hemisphere and two in the right hemisphere. The NBI brain profile indicates how an individual communicates, acts towards other people, and makes

decisions. Higher scores indicate a preference to engage in a particular thinking style (Neethling, 2005).

Data analysis

Data analysis was conducted using SPSS version 25. Descriptive statistics were calculated for the variables (Field, 2013). The strength and direction of the relationships were assessed using the Pearson product-moment correlations (Pearson's *r*), and linear regression analyses were used to investigate whether thinking styles predicted psychological stamina (Cohen, 1992; Field, 2013).

Results and Discussion

Descriptive statistics

Table 1 presents the descriptive and correlational statistics of the variables investigated in this study.

Table 1: Descriptive statistics, alpha coefficients and correlations

Variables/Statistical values	Mean	SD	1	2	3	4	5	6	7	8	9
Grit	3.42	0.62									
Mindset	2.88	0.42	0.03								
Hardiness (Total)	30.67	4.52	0.35**	-0.05							
Hardiness (Challenge)	7.04	2.70	0.05	0.06	0.60**						
Hardiness (Control)	12.91	1.95	0.21**	-0.08	0.52**	-0.04					
Hardiness (Commitment)	10.72	2.71	0.39**	-0.08	0.70**	0.03	-0.04				
NBI-L1	82.12	7.40	0.24**	0.07	0.08	-0.04	0.10	0.10			
NBI-L2	80.75	8.14	0.17**	-0.19**	0.03	-0.15**	0.06	0.15**	.13**		
NBI-R1	63.90	7.82	-0.15**	0.08	0.00	0.15**	0.04	-0.17**	-0.32**	-0.55**	
NBI-R2	72.32	9.51	-0.21**	0.05	-0.09	0.04	-0.16**	-0.07	-0.62**	-50**	0.10

*Note: NBI-L1 = Neethling Brain Instrument Left 1/Quadrant 1; NBI-L2 = Neethling Brain Instrument Left 2/ Quadrant 2; NBI-R1 = Neethling Brain Instrument Right 1/Quadrant 3; NBI-R2 = Neethling Brain Instrument Right 2/Quadrant 4; *$p < 0.05$; **$p < 0.01$*

The mean scores indicated in Table 1 for the Grit Scale (mean = 3.42, SD = 0.62), Hardiness Total (mean = 30.67, SD = 4.52), and the respective hardiness subscales are consistent with data reported elsewhere (Bartone, 2007; Duckworth, 2016). The mean score on the DMI of 2.88 (SD = 0.42) indicates that most students' reported scores are characteristic of a fixed mindset (Dweck, 2008). In other words, most of the participants may have held the belief that learning opportunities are stressful and psychologically threatening. Such an interpretation is consistent with earlier research that indicates first-year students experience disproportionate levels of stress compared to the general population (Bewick et al., 2010; Grøtan et al., 2019) and that this can negatively affect their academic performance (Mason,

2019; Pillay & Ngcobo, 2010). The belief that one's skills, talents, and abilities cannot be developed could also enhance a sense of alienation, negatively affect epistemic access, and ultimately perpetuate low student success (Habib, 2016; Long, 2021).

Grit presented with significant ($p < 0.01$) positive correlations with the total score on the Hardiness Scale ($r = 0.35$), hardiness (control) ($r = 0.21$), and hardiness (commitment) ($r = 0.39$). Similarly, students' reported grit scores were significantly associated ($p < 0.01$) with the L1 ($r = 0.24$) and L2 ($r = 0.17$) thinking style preferences. However, the Grit Scale presented significant ($p < 0.01$) inverse associations with the R1 ($r = -0.15$) and R2 ($r = -0.21$) thinking style quadrants on the NBI. These results indicate that students who reported greater linear (L1) and planning-orientated (L2) thinking preferences were more likely to report higher scores on the self-reported Grit Scale. Thus, it could be deduced that students who adopt linear and planning-orientated thinking styles may report higher grit levels and are likely to approach their academic studies from a disciplined perspective comprising consistent engagement.

In contrast, students who noted a preference for long-term and strategic thinking (R1) and a stronger relational focus (R2) were more likely to report scores associated with lower grit levels. Hence, students who adopt R1 and R2 thinking styles may appear less disciplined in their academic studies but could benefit from greater relational support. However, there is limited to no evidence suggesting significant differences in academic success levels between students based on their unique thinking style preferences (Ghanbari et al., 2020). Instead, it has been hypothesised that students who report R1-related thinking may be more prone to boredom and this lack of interest could present as lower levels of discipline (De Boer et al., 2013; Neethling, 2005). Accordingly, SDS staff should be wary of over-promoting a dichotomous approach concerning academic success. Instead, students' thinking style preferences could offer valuable information on an appropriate way to articulate how they approach their academic studies.

The data indicated that the L2 thinking style preference was positively correlated with hardiness (commitment) ($r = 0.15$, $p < 0.01$) and negatively related with mindset ($r = -0.19$) and hardiness (challenge) ($r = -0.15$, $p < 0.01$). In other words, students who presented with a thinking style preference associated with sequential processing, control, and logical arrangement appeared to report a greater commitment to important life goals (hardiness (commitment)) while also being more likely to endorse a fixed mindset and a lower preference for change and challenging activities (hardiness (challenge)). The inverse relationship with mindset is interesting and could suggest that the planning and cautious nature of the L2 thinking style may predispose students to avoiding the uncertainties associated with challenges, thereby preferring familiar and tried-and-tested methods linked to a fixed mindset (Anderson, 2016; Dweck, 2012; Neethling, 2005).

Students who reported an R1 thinking preference scored higher on the hardiness (challenge) subscale ($r = 0.15$, $p < 0.01$). Thus, it appears that students who exhibit a thinking style preference associated with strategic, exploratory and conceptual thinking are more likely to endorse stressors within the educational context as opportunities for growth and development (De Boer et al., 2013; Neethling, 2005). In contrast, participants with an

R2 preference were less likely to endorse a high score on the Hardiness (Control) Scale (r = -0.16, p < 0.01).

Predicting psychological stamina from thinking styles

Table 2 presents the results from the regression analyses. Only the regression analyses presented with significant relationships are included below.

Table 2: Summary of standard multiple regression analyses

Model 1. DV: Grit IV: L1	**Sum of squares**	***df***	**Mean square**	***F***	***p***	***R²***	**Adjusted *R²***
Regression	8.43	1.0	8.43	23.03	0.01**	0.06	0.06
Residual	134.29	367.00	0.37				
Total	142.71	368.00	-				
Model 2. DV: Grit IV: L2	**Sum of squares**	***df***	**Mean square**	***F***	***p***	***R²***	**Adjusted *R²***
Regression	4.09	1.0	4.09	10.83	0.01**	0.03	0.03
Residual	138.62	367.00	0.38				
Total	142.71	368.00	-				
Model 3. DV: Mindset IV: L2	**Sum of squares**	***df***	**Mean square**	***F***	***p***	***R²***	**Adjusted *R²***
Regression	2.49	1.0	2.49	14.31	0.01**	0.04	0.03
Residual	63.90	367.00	0.17				
Total	66.39	368.00	-				
Model 4. DV: Grit IV: R1	**Sum of squares**	***df***	**Mean square**	***F***	***p***	***R²***	**Adjusted *R²***
Regression	3.06	1.0	3.06	8.05	0.01**	0.02	0.02
Residual	139.65	367	0.38				
Total	142.71	368	-				
Model 5. DV: Hardiness (Challenge) IV: L2	**Sum of squares**	***df***	**Mean square**	***F***	***p***	***R²***	**Adjusted *R²***
Regression	57.55	1.0	57.55	8.03	0.01**	0.02	0.02
Residual	2630.42	367	7.17				
Total	2687.97	368	-				
Model 6. DV: Hardiness (Commitment) IV: L2	**Sum of squares**	***df***	**Mean square**	***F***	***p***	***R²***	**Adjusted *R²***
Regression	62.24	1.0	62.24	8.67	0.01**	0.02	0.02
Residual	2635.45	367	7.18				
Total	2697.69	368	-				

Model 7. DV: Hardiness (Challenge) IV: R1	**Sum of squares**	***df***	**Mean square**	***F***	***p***	R^2	**Adjusted R^2**
Regression	59.31	1.0	59.31	8.28	0.01**	0.02	0.02
Residual	2628.66	367	7.16				
Total	2687.97	368	-				
Model 8. DV: Hardiness (Commitment) IV: R1	**Sum of squares**	***df***	**Mean square**	***F***	***p***	R^2	**Adjusted R^2**
Regression	82.71	1.0	82.17	11.53	0.01**	0.03	0.03
Residual	2615.52	367	7.13				
Total	2697.69	368	-				
Model 9. DV: Hardiness (Control) IV: R2	**Sum of squares**	***df***	**Mean square**	***F***	***p***	R^2	**Adjusted R^2**
Regression	35.03	1.0	35.03	9.43	0.01**	0.03	0.02
Residual	1363.02	367	3.71				
Total	1398.05	368	-				

*Note: AHS – Adult Hope Scale; FS – Flourishing Scale; SDHS – Short Depression Happiness Scale; AA – Academic achievement; *$p < 0.05$ – Statistically significant; **$p < 0.01$ – Statistically significant*

Consistent with the correlations reported in Table 1, the data in Table 2 indicate that the L1 thinking style preference is predictive of higher grit scores ($F(1,367) = 23.03, p < 0.01$). However, the L1 thinking preference accounted for only 6% of the variance ($R^2 = 0.06$) in students' reported grit scores. Hence, with specific reference to the L1 thinking style, thinking style preference is one of various factors that account for students' reported scores on the Grit Scale.

Noteworthy regression equations were also found in predicting grit ($F(1,367) = 10.83$, $p < 0.01$) and mindset ($F(1,367 = 14.31, p < 0.01$) from the L2 thinking style. Furthermore, the L2 thinking preferences predicted 2% ($R^2 = 0.02$ of the variance in grit, and 2% ($R^2 = 0.02$) of the variance in mindset.

Regarding the predictions in hardiness, the L2 thinking style served as a significant predictor of hardiness (commitment) ($R^2 = 0.02, F(1,367) = 8.67, p < 0.01$), and hardiness (challenge) ($R^2 = 0.02, F(1,367) = 8.03, p < 0.01$). However, it should be noted that the L2 and hardiness (challenge) constructs are inversely related ($r = -0.15$) that suggests higher reported L2 thinking style preferences would indicate lower hardiness (challenge) scores. The R1 thinking style preference served as a significant predictor variable for lower grit scores ($R^2 = 0.02, F(1,367) = 8.05, p < 0.01$) and higher hardiness (challenge) scores ($R^2 = 0.02, F(1,67) = 8.28, p < 0.01$).

Theoretical and Practical Implications

The results from this study have theoretical and practical implications. Regarding theoretical implications, the results indicate that grit and commitment are strongly associated with linear thinking preferences. Students who exhibited linear thinking styles (L1 and L2) appeared to be more likely to report higher scores on the Grit Scale and

the Hardiness (Commitment) Scale. In contrast, students who were more inclined to exploratory and relational thinking styles (R1 and R2) tended to report lower grit and commitment scores but scored higher on the Hardiness (Challenge) Scale. In light of these results, we hypothesise that students who prefer linear thinking styles may report greater perseverance concerning their academic studies while avoiding challenges and being more inclined to a fixed mindset orientation. Conversely, students who are inclined towards R1 and R2 thinking styles may be more willing to endorse lower grit and commitment scores, and they may tend to be more prone to embracing challenges.

The modern-day educational and work environments require greater agility concerning thinking style preferences (Schwab, 2016). In other words, people are challenged to pursue meaningful goals with passion, purpose and commitment while also remaining flexible regarding the challenges posed by change (Schwab, 2016). Thus, a dynamic balance in terms of thinking style preferences appears to be essential to assist students in developing the requisite psychological stamina to address educational and other challenges. In theory, students ought to become comfortable with straddling the tension between L1 and L2 and R1 and R2 thinking style preferences as they encounter ever greater levels of complexity in the world (Dweck, 2012; Neethling, 2005; Schwab, 2016).

Regarding practical implications, the results offer food for thought for persons working in SDS environments. Whereas a substantial body of literature points to the importance of grittiness and mindset as enablers of student success (Duckworth, 2016; Dweck, 2008), this study suggests that SDS practitioners should consider students' thinking style preferences as critical to interpreting the relevance and importance of specific non-cognitive factors regarding student success.

Furthermore, the results indicate that a one-size-fits-all approach would not be adequate regarding grit, mindset and hardiness as these constructs are related to students' thinking style preferences that may not necessarily be malleable and changeable. However, the results could serve as valuable feedback to SDS practitioners in developing the necessary psychological stamina associated with student success. For example, SDS practitioners could focus on helping students with L1 and L2 thinking style preferences develop their capacity to embrace challenges and remain mindful that the learning process can promote flourishing and personal growth (Maddi et al., 2012; Yeager et al., 2013). Similarly, students who show a propensity for R1 and R2 thinking style preferences could be assisted in developing the commitment, passion and perseverance for goal pursuit (Dweck, 2012; Maddi et al., 2009).

Finally, it is strongly suggested that SDS practitioners should augment the assessment of these and other psychological constructs with personalised feedback and attempt to provide individualized self-development opportunities for students based on their unique psychological stamina and thinking styles preferences (Foxcroft & Roodt, 2013; Mason, 2019). For example, students could be assisted in developing greater self-awareness of their respective psychological stamina and thinking style profiles through psychosocial support programmes, such as hardiness training and individual or group-based coaching (Cilliers, 2014; Mason, 2019). Such approaches can assist students in identifying their unique

strengths and enhancing development areas, and ultimately enhance student success (Lewin & Mawoyo, 2014; Maddi et al., 2009).

Conclusion

This study investigated the empirical linkages between thinking style preference and psychological stamina. The results showed significant positive relationships between linear and planning-orientated thinking preferences (L1 and L2) and grittiness and hardiness (commitment). In contrast, the R1 and R2 quadrants were negatively associated with grit and hardiness (commitment) but positively related to hardiness (challenge). The findings suggest that thinking styles may influence how students express the constructs associated with psychological stamina within the higher education context. In light of these findings, we suggest that SDS practitioners should consider thinking style preferences when exploring the expression and value of psychological stamina regarding student well-being.

That said, this study was limited in the following ways: first, the study adopted a cross-sectional research design that does not account for dynamic changes across time. Hence, the data provided a snapshot of students' experiences at a particular point in time. Students' experiences could have changed over time due to external experiences, such as a changing landscape amidst the COVID-19 pandemic. Second, the data were collected from students at a single South African university. Therefore, the findings may not necessarily be generalizable to other contexts. Third, data were only collected on three constructs associated with psychological stamina: grit, mindset and hardiness. The inclusion of additional constructs could have provided greater insight into the dynamic interaction between thinking style preferences and psychological stamina.

We propose that future research should focus on collecting data from students using longitudinal designs. Adopting longitudinal strategies would enable researchers to gain a better understanding of students' experiences as they progress through an academic year and throughout their academic studies. Additionally, researchers should consider exploring the importance of psychological stamina using qualitative approaches, which could shed light on students' lived experiences and the relevance of psychological stamina in terms of student success. Finally, the development and evaluation of support programmes that integrate a focus on well-being and thinking style preferences should be pursued.

The study contributes to the existing body of literature by drawing attention to the influence of thinking styles on the expression of psychological stamina among first-year students. Furthermore, the study foregrounds the necessity of considering constructs related to well-being alongside thinking style preferences if the goal is to promote student success holistically. Finally, the data reported here could assist SDS practitioners in promoting holistic student success by helping students embrace and develop psychological stamina capacity that may not necessarily be associated with their respective thinking styles.

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