

**AN EXPLORATION OF PSYCHOLOGICAL GRIT AS A PREDICTOR OF  
STUDENT RETENTION IN AN OPEN DISTANCE LEARNING (ODL)  
INSTITUTION**

by

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## DECLARATION

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### **An exploration of psychological grit as a predictor of student retention in an Open Distance Learning (ODL) institution**

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.



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SIGNATURE

16<sup>th</sup> August 2019

DATE

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---

<sup>1</sup> We should consider publishing our e-mails – they are a delightful read, sure to evoke a smile on any researcher's face.

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## ABSTRACT

This research study explored the predictive value of psychological grit in determining student retention among postgraduates in an Open Distance Learning (ODL) institution in South Africa. Working from within a quantitative framework (and adopting a correlational research design), an online version of the Grit-S scale was utilised to gauge participants' levels of grit ( $n = 837$ ), followed by one-year lagged secondary data which sought to ascertain retention among the sample.

Seeking to explore the psychometric rigour of the Grit-S scale, exploratory and partial confirmatory factor analyses were employed to investigate the validity of the instrument, followed by the assessment of Cronbach's alpha coefficients. Thereafter, correlations and binary logistic regressions were employed to investigate the relationship between the constructs and explore grit's ability to predict retention from one academic period to the next. Results from the analyses indicated that, while the Grit-S scale demonstrates sound validity and reliability for use within ODL settings, grit was neither related to retention nor could it significantly predict retention among the current sample.

Although these results do not negate grit's reported role in determining successful student outcomes in traditional higher education settings, they bring to the fore a need to critically re-examine grit's contribution to understanding retention, not only among ODL students, but among those whose socio-economic circumstances remain a crucial barrier. As such, pre-emptive strategies aimed at retaining students should rather focus on mitigating the immediate, and often negative, socio-economic circumstances faced by students, rather than intervening based on their levels of psychological grit.

**Key words:** Psychological grit; student retention; Open Distance Learning (ODL); distance education; higher education; predictors of student retention; Grit-S scale; validity; reliability; South Africa

## LIST OF ACRONYMS AND ABBREVIATIONS

ACT	American College Test
AL	Academic Literacy
ALDAT	Academic Literacies Diagnostic Assessment Tool
ALT	Academic Literacies Test
ARSOF	Army Special Operation Forces
CACH	Central Applications Clearing House
CAES	College of Agricultural and Environmental Sciences
CAS	College of Accounting Sciences
CEDU	College of Education
CEMS	College of Economic and Management Sciences
CESM	Classification of Educational Subject Matter
CFA	Confirmation Factor Analysis
CFI	Comparative Fix Index
CGS	College of Graduate Studies
CHAID	Chi-square Automatic Interaction Detector
CHE	Council on Higher Education
CHS	College of Human Sciences
CI	Confidence Interval
CLAW	College of Law
CSET	College of Science, Engineering and Technology
DCCD	Directorate for Counselling and Career Development
DET	Department of Education and Training
DHET	Department of Higher Education and Training

DST	Department of Science and Technology
EFA	Exploratory Factor Analysis
FET	Further Education and Training
FGS	First-Generation Student
FYGPA	First Year Grade Point Average
GCSE	General Certificate of Secondary Education
GET	General Education and Training
GPA	Grade Point Average
HAU	Historically Advantaged University
HDU	Historically Disadvantaged University
HE	Higher Education
HEI	Higher Education Institution
HEMIS	Higher Education Management Information System
HEQSF	Higher Education Qualifications Sub-Framework
HESA	Higher Education South Africa
HET	Higher Education and Training
HSGPA	High School Grade Point Average
HSRC	Human Sciences Research Council
IPIP	International Personality Item Pool
IRRODL	International Review of Research in Open and Distributed Learning
KMO	Kaiser-Meyer-Olkin
LLB	Bachelor of Laws
LOC	Locus of control
LoLT	Language of Learning and Teaching

MAT	Mathematics
MLE	Maximum Likelihood Estimation
NBT	National Benchmark Test
NDP	Non-Degree Purposes
NFI	Normed Fit Index
NPHE	National Plan for Higher Education
NQF	National Qualifications Framework
NSC	National Senior Certificate
NSFAS	National Student Financial Aid Scheme
ODL	Open Distance Learning
ODeL	Open Distance e-Learning
OR	Odds Ratio
OUUK	Open University of the United Kingdom
PCFA	Partial Confirmatory Factor Analysis
PG	Postgraduate
QL	Quantitative Literacy
RMSEA	Root Mean Square Error of Approximation
ROAP	Responsible Open Admission Project
RPSC	Research Permission Subcommittee
RQ	Research Question
RSA	Republic of South Africa
SAQA	South African Qualifications Authority
SA	South Africa
SAT	Scholastic Aptitude Test

SATAP	Standardised Assessment Test for Access and Placement
SC	Senior Certificate
SEM	Structural Equational Model
SES	Socio-economic Status
SIM	Student Integration Model
SPSS	Statistical Package for Social Sciences
SRC	Student Representative Council
SRMR	Standardised Root Mean Residual
TLI	Tucker-Lewis Index
TSA	Technikon South Africa
TVET	Technical and Vocational Education and Training
UG	Undergraduate
UNISA	University of South Africa
UoT	University of Technology
UPENN	University of Pennsylvania
VIF	Variance Inflation Factor

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## **CHAPTER 1: OVERVIEW OF THE CURRENT STUDY**

This study investigates the predictive value of psychological grit in determining the retention of honours students in a dedicated Open Distance Learning (ODL) institution, namely the University of South Africa (UNISA). Such a study may provide distance education practitioners with the much-needed insight into the influence of grit on retention patterns, potentially informing pre-emptive strategies aimed at retaining students. In presenting this rationale, the researcher highlights the alarming retention rates, first broadly and then among the honours cohorts, before drawing attention to the lack of research conducted on psychological grit and the predictive value it may add to the South African ODL landscape. The research aims, design and data analysis strategies of the study are then discussed, followed by an outline of the remaining chapters.

### **1.1. The challenge of retaining students in Higher Education**

Student persistence and retention are some of the most formidable issues currently facing higher education institutions (HEIs) globally (Subotzky, 2011). The pressure to retain tertiary students emanates from the momentous changes in higher education (HE) worldwide which have resulted in the movement from an elite system of HE, servicing a limited number of students, to a diverse massified one (Council on Higher Education [CHE], 2016; Crosling, Thomas, & Heagney, 2008, p. 1). This can be seen in the expansion of students from previously underrepresented groups, different ethnicities and language groups, lower socio-economic backgrounds, together with those who are older, disabled or for whom HE is the

first family experience<sup>2</sup> (Crosling et al., 2008; Department of Higher Education and Training [DHET], 2017b).

### **1.1.1. South Africa**

The South African context mirrors the global picture described above, and includes a highly diverse student population with many disadvantaged and under-prepared students, who find coping with the scholarly and financial demands of HE a difficult feat to achieve (Du Plessis & Gerber, 2012; Koen, 2007; Moodley & Singh, 2015; Scott, Yeld, & Hendry, 2007; Subotzky, 2011). In addition, the South African HE sector has seen a rapid increase in first-generation students in HEIs (Moodley & Singh, 2015). On this note, Lehohla (2017) revealed that close to 70% of tertiary students in South Africa in 2016, between the ages of 20-34 years, were the first in their families to enrol in tertiary studies. On a related note, Letseka (2009, 2015) and Letseka, Cosser, Breier and Visser (2009) revealed that approximately 70% of the students who drop out of South African universities have no siblings or parents with university experience and are often less academically prepared. This, together with the demands of tertiary study and the psychological pressures of being the first in the family to attend HE, make it more difficult to cope, all of which is reported to contribute to the decision to drop out (Moodley & Singh, 2015). This is discussed further in Chapter 2.

In South Africa, these problems are evident “manifestations of the impact of many years of their families’ exclusion from opportunities and privileges by apartheid legislation” – a point that is well argued by Letseka (2009, p. 96). Lamentably, after 25 years of democratic rule,

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<sup>2</sup> Known as a first-generation student (FGS). This is discussed further in Section 2.2.4.

the post-apartheid government has been unable to rectify all of these inequalities and inefficiencies (Subotzky, 2011). Many students still come from disadvantaged backgrounds, are academically under-prepared, and continue to face challenging socio-economic and financial circumstances that, in combination, threaten student retention (Subotzky, 2011).

#### **1.1.1.1. The extent of the problem**

To illustrate the plight of student retention in South Africa, attention is drawn to South Africa’s first national cohort analysis conducted on the 2000 first-time entering, undergraduate cohort (Scott et al., 2007). Results from the analyses indicated that, five years after entering, only 30% of this cohort had graduated; 56% had left their original institutions without graduating, and 14% were still registered, as illustrated in Table 1 below (Scott et al., 2007).

**Table 1: Retention and throughput statistics for the 2000 first-time entering cohort (The public HE sector)**

<b>Institutions</b>	<b>Graduated within five years</b>	<b>Still registered after five years</b>	<b>Left without graduating</b>
All public universities	38%	17%	45%
All public technikons	23%	11%	66%
All public HEIs in total	30%	14%	56%

Source: Scott et al., 2007

In comparing the throughput rates between contact-based HEIs and those offering tuition at a distance, a stark difference is evident. A separate cohort analysis conducted by the Department of Higher Education and Training (DHET, 2017a), revealed that, over a 10-year

period, only 11.6% of the 2000 undergraduate cohort who studied via distance learning had persisted to completion (Figure 1). While 8.3% of the cohort was still in progress, 80.1% had dropped out (Figure 2).

Intake year (Year 1)	GRADUATES (%)							
	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
2000	3.2	5.4	7.4	8.6	9.4	10.2	11.0	11.6
2001	3.2	5.2	7.0	8.3	9.2	10.1	11.1	12.0
2002	9.0	11.0	12.7	13.9	14.9	15.9	16.8	17.6
2003	4.3	6.1	7.8	9.4	10.7	11.9	13.1	14.1
2004	4.1	6.3	8.3	10.0	11.6	12.9	14.0	15.3
2005	1.8	3.9	6.3	8.5	10.3	11.8	13.4	14.8
2006	1.9	4.2	6.6	8.7	10.5	12.2	14.0	15.4
2007	2.7	5.6	8.4	10.9	13.6	15.9	17.9	
2008	1.7	4.7	7.7	11.3	14.4	16.9		
2009	2.1	6.3	11.4	16.3	20.2			
2010	2.3	6.8	12.8	18.5				
2011	2.2	6.9	13.6					
2012	1.5	5.4						
2013	1.8							
2014								

**Figure 1: Throughput rates among distance education cohorts in public HEIs in South Africa**

Source: DHET, 2017a, p. 19

Intake year (Year 1)	DROPOUTS (%)								
	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
2000	56.8	66.0	71.3	73.7	76.9	78.2	79.2	79.2	80.1
2001	55.2	65.0	69.5	74.1	76.7	78.3	78.3	79.1	79.1
2002	49.9	59.7	67.2	70.8	72.8	73.5	74.2	74.1	74.2
2003	50.1	64.8	71.2	73.9	75.7	76.2	76.0	75.8	75.9
2004	52.0	64.6	69.7	72.2	74.0	74.2	74.5	74.6	73.8
2005	47.4	63.4	67.8	70.6	71.9	72.9	73.9	72.9	74.4
2006	52.7	64.1	69.3	71.6	72.6	73.6	72.8	74.5	75.2
2007	48.0	59.0	63.7	66.2	68.0	67.3	69.8	70.5	
2008	46.5	57.5	61.8	65.0	65.3	68.3	69.1		
2009	35.9	48.7	54.1	55.5	59.9	61.3			
2010	34.7	48.2	51.4	56.9	58.7				
2011	35.9	45.0	53.4	56.5					
2012	31.7	48.0	53.1						
2013	37.7	50.4							
2014	30.7								

*Figure 2: Attrition rates among distance education cohorts in public HEIs in South Africa*

Source: DHET, 2017a, p. 19

While marginal increases in the throughput rates are evident among subsequent distance education cohorts, the retention rates do not compare favourably to the rest of the HE sector and remain a concern for the South African HE context (DHET, 2017a).

### 1.1.2. A case for the University of South Africa (UNISA)

Of particular concern among the distance education cohorts is the retention and throughput of students at UNISA, the largest ODL institution in South Africa, and on the African continent (Barnes & Van Zyl, 2012, 2014b; CHE, 2015; DHET, 2017a; Directorate for Institutional Research, 2015; Scott et al., 2007; Swanepoel et al., 2011). With more than one-third (34%, ca. 330,000) of all tertiary students currently enrolled in public HEIs in South Africa, this dedicated ODL institution plays a substantial role in the data cited in Figures 1 and 2 above (DHET, 2017a).

Scott et al. (2007) also captured the extent of the problem among UNISA students during the first national cohort study (Table 2). Their results revealed that, while 14% of UNISA’s 2000 first-time entering cohort had graduated, only 27% of the cohort was still registered after five years<sup>3</sup>. Among the UNISA cohort, 59% had dropped out over the same period, a notable difference from the 38% attrition rate reported among contact-based HEIs, as seen in Table 2.

**Table 2: Retention and throughput statistics for the 2000 first-time entering cohort (Public contact-based universities vs. UNISA)**

<b>Institutions</b>	<b>Graduated within five years</b>	<b>Still registered after five years</b>	<b>Left without graduating</b>
Public contact-based universities (excl. UNISA)	50%	12%	38%
University of South Africa (UNISA)	14%	27%	59%
All public universities	38%	17%	45%

Source: Scott et al., 2007

Clearly, UNISA is particularly susceptible to poor retention rates (when compared to its contact-based counterparts) and the negative implications associated with this (CHE, 2010a, 2015; Scott et al., 2007; Subotzky, 2011; Swanepoel et al., 2011). Across the HE sector these

<sup>3</sup> The ODL nature at UNISA often affects the time it takes students to complete their respective qualifications (CHE, 2015). Accordingly, UNISA’s Admission Policy allows a maximum of three years to complete a 120-credit qualification (an honours degree is 120 credits), eight years to complete a 360-credit qualification and a maximum of ten years to complete a 480-credit qualification (UNISA, 2011).

implications include, but are not limited to the loss of prestige, revenue and government subsidy for the institutions, emotional distress caused by the failure of the experience in HE, and a loss of confidence in the institution and student alike (Archer, Chetty, & Prinsloo, 2014; Van Zyl, 2010). From an economic perspective, tertiary students who do not persist to completion may lack the skills, knowledge and credentials to enter the labour market (Crosling, Heagney, & Thomas, 2009; Hagedorn, 2005). In this regard, the retention of students or the deficiency thereof directly influences both the shortage of high-level skills in the professional workforce (Letseka & Maile, 2008) and the economic well-being of the country (Jordaan, Van Heerden, & Jordaan, 2014).

#### **1.1.2.1. A case for honours students**

While the aforementioned cohort analyses provide a great deal of insight into the retention and throughput of *undergraduate* HE students in South Africa, a scoping of the literature revealed a gap in terms of studies concerning *postgraduate* students in the country (Mouton et al., 2015). Seeking to narrow the gap, Mouton et al. (2015) examined the 2001 and 2008 entering honours<sup>4</sup> cohorts ( $N = 17,773$  and  $N = 26,148$  respectively) in public HEIs over a period of years. Results revealed that 66.3% of the 2001 cohort and 65.5% of the 2008 cohort had graduated within five years (see Figure 3). Further increases in completion thereafter appear to be marginal for both cohorts, increasing by less than 1% per year.

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<sup>4</sup> According to the Higher Education Qualifications Sub-Framework (HEQSF), honours students are considered postgraduate students within the South African higher education system (DHET, 2013a).

	2001			2008		
	Actual	%	Cumul %	Actual	%	Cumul %
<b>Y1</b>	7089	39.9%	39.9%	8333	31.9%	31.9%
<b>Y2</b>	2740	15.4%	55.3%	4208	16.1%	48.0%
<b>Y3</b>	1155	6.5%	61.8%	2763	10.6%	58.5%
<b>Y4</b>	512	2.9%	64.7%	1243	4.8%	63.3%
<b>Y5</b>	289	1.6%	66.3%	586	2.2%	65.5%

*Figure 3: Completion rates among honours cohorts in public HEIs in South Africa*

Source: Mouton et al., 2015, p. 42

Although UNISA students cannot be isolated in the study by Mouton et al. (2015), the study provides useful insight into the retention and throughput among honours students in South Africa attending both contact and distance learning institutions. Among UNISA students specifically, a recent report compiled by UNISA’s Directorate for Institutional Research (2015) alluded to the fact that the honours cohorts in the university exhibited poorer retention and graduation rates when compared to the undergraduate and other postgraduate clusters. Using aggregated data captured over a period of between eight and ten years, analyses revealed year-on-year increases in the throughput rates for all qualifications clusters, with the exception of the honours cohorts (Directorate for Institutional Research, 2015). The completion rates among the honours cohorts dropped from 25.1% in 2011 to 24.8% in 2012, and then to 24.7% in 2013 (see Table 3). Although considered a relatively small decrease, it should be noted that the data represents a 10-year trend of all entering honours cohorts (from 2004 onwards). As such, the importance of these results lies in the observed trend over time, which indicates that, on average, less than a quarter of the honours cohorts at UNISA persist to the point of completion, with these figures demonstrating unfavourable trajectories for the future.

**Table 3: Retention and throughput statistics for the 2004-2014 postgraduate cohorts**

Postgraduate qualification clusters	2004-2011		2004-2012		2004-2013		
	UNISA	Graduates	UNISA	Graduates	UNISA	Graduates	
	Expected	Average	Expected	Average	Expected	Average	
	Min. time (yrs.)	cohort size	Min. time	cohort size	Min. time	cohort size	
Postgraduate certificate/diploma	1.9	2 803	34.0%	3 631	35.0%	4 325	35.8%
Honours & equivalent	1.7	8 014	25.1%	7 980	<b>24.8%</b>	7 967	<b>24.7%</b>
Masters & equivalent	5.0	1 880	19.6%	1 883	20.6%	1 910	22.7%
Doctoral & equivalent	4.1	269	14.1%	282	14.9%	308	15.3%

Censoring year: 2014

Source: Directorate for Institutional Research, 2015

While it has been noted that postgraduate student enrolments and throughput rates are “low and sorely inadequate in relation to South Africa’s economic and social development needs” (Badat, 2010, p. 20), those reported among the honours cohorts at UNISA fall well below the figures revealed in the national study by Mouton et al. (2015). Their report, as cited above, indicated that on a national level, approximately 66% of honours students had completed their studies over a five-year period, whereas only a quarter of those enrolled at UNISA had been retained to the point of completion (Table 3).

For this reason, the honours cohorts have been identified as a focus area in the Research, Postgraduate Studies, Innovation and Commercialisation portfolio<sup>5</sup> at UNISA (Barnes & Van Zyl, 2016). As such, their retention and success need to be carefully monitored. This is therefore a timely study, as the need to increase the production, effectiveness and quality of postgraduates in South Africa, particularly among the honours cohorts, is self-evident (Mouton et al., 2015).

### **1.1.3. An overview of the predictors of student retention in Open Distance Learning (ODL)**

Research on student retention within ODL settings suggests that several factors influence a student's decision to persist (Lee & Choi, 2013). Prominent among these is previous academic achievement, with both dated and recent empirical research evidence highlighting a positive relationship between the two constructs within a distance education environment (Ashby, 2004; Bernard, Brauer, Abrami, & Surkes, 2004; Cochran, Campbell, Baker, &

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<sup>5</sup> The portfolio consists of the Research Administration Department, the College of Graduate Studies (CGS), and the UNISA Library.

Leeds, 2014; Dupin-Bryant, 2004; Morris, Wu, & Finnegan, 2005). Generally, these studies indicate that students with higher levels of academic achievement are more likely to persist.

Other ODL-related studies have identified demographic attributes, such as gender, age, ethnicity, financial aid, number of children, and marital and employment status as significant predictors<sup>6</sup> (Morris et al., 2005; Wolff, Zdrahal, Nikolov, & Pantucek, 2013; Yasmin, 2013). Among these variables, age and gender emerge as the most prominent factors influencing student persistence (Carr, 2000; Cochran et al., 2014; Fjortoft, 1995; Morris et al., 2005; Müller, Prinsloo, & Du Plessis, 2007; Yasmin, 2013).

From a psychological perspective, both recent and dated studies have suggested that students with an internal locus of control (LOC) are more likely to persist in an ODL environment due to the self-directed nature of the learning (Dille & Mezack, 1991; Joo, Joung, & Sim, 2011; Lee & Choi, 2013; Liebenberg & Van Zyl, 2012; Parker, 1999). Uba (1997) supported this proposition and further suggested that self-efficacy and self-directedness are pertinent to understanding student persistence in distance education, as did Holder (2007), Lim (2001), Prinsloo (2009) and Van der Westhuizen (2014). Similarly, Wang, Peng, Huang, Hou, and Wang (2008) revealed that self-efficacy is related to success among ODL students, albeit indirectly. Their analysis revealed that learning motivation, among others, mediated this relationship (Wang et al., 2008).

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<sup>6</sup> Not to be confused with causation, where the independent variable *causes* the outcome (i.e. the dependent variable). Rather, prediction suggests that the independent variable *predicts* the dependent variable if, on average, the dependent is the expected outcome of the independent variable occurring. Whereas causality is deterministic, prediction is probabilistic (Retrieved from <https://stats.stackexchange.com/questions/208087/what-is-the-difference-between-correlation-causation-and-prediction>).

On that note, there are many who maintain that motivation is the predominant non-cognitive factor affecting student retention (Boyd, 2004; Dille & Mezack, 1991; Du Plessis, Müller, & Prinsloo, 2005; Fjortoft, 1995; González, 2015; Müller et al., 2007; Simpson, 2013; Wang et al., 2008). Within UNISA's context, Müller et al. (2007, p. 29) revealed "that motivation is the most important lead in the success profile chain". Notwithstanding "the near-universal belief amongst educators in the efficacy of motivation in distance learning" (Simpson, 2008, p. 160), recent research has speculated, and subsequently revealed, that the relationship between motivation and student retention and success is significantly mediated by another non-cognitive trait: psychological grit (Reraki, Celik, & Saricam, 2015; Von Culin, Tsukayama, & Duckworth, 2014). Although considered in its infancy (Duckworth & Gross, 2014), grit<sup>7</sup>, defined as perseverance and passion for long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007), has shown to predict success and retention across numerous educational contexts.

However, a scoping of the literature uncovered a gap in the discourse among student retention and psychological grit within a South African ODL context. The grit literature appears to have its roots deeply embedded in American contact-based HEIs, high school settings and military academies (Chang, 2014; Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011; Duckworth et al., 2007; Duckworth & Quinn, 2009; Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014; Rimfeld, Kovas, Dale, & Plomin, 2016; Robertson-Kraft & Duckworth, 2014; Strayhorn, 2013). Nonetheless, there are international studies which have explored the value of psychological grit within distance education settings (Cross, 2014; Hwang, Lim, & Ha, 2017; Neroni, Gijsselaers, Kirschner, & De Groot, 2015;

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<sup>7</sup> The terms 'Psychological grit' and 'Grit' are used synonymously throughout the remainder of the text.

Wang & Baker, 2018). Lamentably though, these studies examined *performance* measures and not *retention* from one academic period to the next. With UNISA honours cohorts particularly susceptible to lower *retention* rates (as shown above) and a considerable lack of evidence on the *grit-retention* relation in ODL, an investigation of this probable predictor is justified.

## **1.2. Research aims and objectives**

The primary aim of the study therefore rests upon testing the theory of grit (Duckworth et al., 2007) and exploring its predictive value in determining the retention of ODL students, using a sample of the 2017 entering honours cohort at UNISA. The research objectives are as follows:

1. To establish the psychometric properties of the Grit-S scale for use within an ODL context;
2. To examine the relationship between grit and student retention;
3. To explore the predictive validity of grit in determining student retention; and lastly
4. To assess whether grit adds incremental predictive value in determining student retention when controlling for previous academic performance (operationalised using the matric<sup>8</sup>- and undergraduate aggregates).

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<sup>8</sup> In South Africa, "matriculation" (usually shortened to "matric") is a term commonly used to refer to the final year of high school and the qualification received on graduating from high school (now officially the National Senior Certificate or NSC).

### **1.3. Research questions**

With the aim and objectives in mind, a focal research question was formulated: Do higher levels of psychological grit significantly predict the retention of honours students from first to second year in ODL? This central research question, the sub-questions (listed beneath) are based on the existing literature by Chang (2014), Duckworth et al. (2007), Duckworth and Quinn (2009), Eskreis-Winkler et al. (2014), and Strayhorn (2013), all of whom utilised psychological grit as a basis for explaining and understanding either success or retention among students in various educational contexts. The sub-questions of the study are:

1. Is the Grit-S scale a valid and reliable instrument for use within a South African ODL context?
2. Is there a statistically significant relationship between grit and postgraduate student retention within a South African ODL institution?
3. Is grit a significant predictor of postgraduate student retention within a South African ODL institution?
4. And if so, does grit predict retention when controlling for previous academic performance?

### **1.4. Research paradigm and design**

With the nature of the research questions in mind, it seems appropriate to work from within the positivist paradigm. Positivism focusses on discovering the truth and presenting it through empirical means (Henning, Van Rensburg, & Smit, 2004). It is predicated on the belief that universal laws govern phenomena, and that uncovering these laws enables one to investigate, confirm and predict events (Taylor & Medina, 2013; Tuli, 2011).

Within this paradigm, an exploratory, correlational research design was deemed most suitable to identify relationships, analyse associations, and facilitate the hypothesised predictions between grit and student retention (Lobmeier, 2012). The study was exploratory in nature, as it sought to identify a potentially novel factor of retention amongst a target population of distance education students. It was also passive in its design (i.e. non-experimental), as there was no intent to manipulate the independent variables (Cross, 2014). Lastly, the study made use of a correlational design to analyse the relationships between the dependent (i.e. retention) and independent variables (i.e. grit and the previous performance aggregates).

### **1.5. Data collection method**

The data was collected in a manner consistent with this research design, utilising an online survey and secondary data from UNISA's institutional database. The online survey comprised three sections: 1) registration information and previous academic aggregates; 2) demographic attributes; and 3) the Grit-S scale.

The Grit-S scale is a revised version of the Grit-O scale (Duckworth et al., 2007; Duckworth & Quinn, 2009), and houses the focal dimensions incorporated in the definition: passion (or consistency of interest), and perseverance (of effort). The Grit-S scale consists of eight Likert-scale questions, ranging from *Not at all like me* to *Very much like me*. Sample items include *Setbacks don't discourage me* or *I finish whatever I begin*. Responses to each question have a corresponding point value, ranging from 1 to 5. The maximum score is 5 (extremely gritty), and the lowest is 1 (not at all gritty) (Duckworth & Quinn, 2009). Point

values for each item are then added together and divided by eight to compute a student's level of grit (Duckworth & Quinn, 2009).

Using LimeSurvey<sup>9</sup>, primary data was gathered from the online survey during the latter half of the 2017 academic year. Once gathered, preliminary descriptive analyses were conducted to ascertain the demographic and grit profile of the sample. Upon commencement of the 2018 academic year, the one-year lagged secondary data (i.e. retention status) was requested from the University's Registrar. Student numbers were paired with the respective grit data and assigned a retention status (i.e. 1 if retained, 0 if not retained).

## 1.6. Sample

Adopting a stratified random sampling<sup>10</sup> strategy, the researcher aimed to survey at least 368 entering honours students (from the 2017 cohort) to ensure sufficient data was collected from the stratum to conduct the necessary analyses<sup>11</sup>. Moreover, achieving this sample size would allow for generalisability to the broader target population of honours students, so long as it is representative (Martínez-Mesa, González-Chica, Bastos, Bonamigo, & Duquia, 2014).

Accordingly, a census approach was adopted, and the survey was sent to all honours students who registered for their degree for the first time in 2017 ( $N = 8,689$ ). Those who responded within the allocated timeframe constituted the final sample ( $n = 837$ ). The sample did not comprise any students enrolled for undergraduate studies, postgraduate

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<sup>9</sup> LimeSurvey is a free and open source online statistical survey web app.

<sup>10</sup> Stratified random sampling is a method for sampling from a population whereby the population is divided into non-overlapping sub-groups of units called strata. These strata are mutually exclusive and exhaustive, and share a common characteristic (DeYoreo, 2018).

<sup>11</sup> Using a 5% margin of error (i.e. Confidence Interval), 95% Confidence Level, 50% Response distribution, and a target population size of 8,689. See <http://www.raosoft.com/samplesize.html>.

certificates/diplomas, masters and doctoral studies, occasional/other studies, or those registered for non-degree purposes (NDP).

### **1.7. Population**

The target population to which this research aims to generalise comprises the 2017 *entering* honours students at the institution ( $N = 8,689$ ). While demographic details of this target population are somewhat scarce in UNISA's annual reports, it is presumed that this group mimics the broader student population. According to UNISA's 2016 Annual Report, the student body is predominantly female (64.6%); and mostly African (72.4%) (UNISA, 2016a). In a different report, Tloubatla, Van Zyl and Barnes (2016) indicated that the majority of UNISA students are between the ages of 25 and 39 years (58.9%) and present with no disabilities (99%). While not cited in UNISA's 2016 Annual Report, nor in the reports by Liebenberg and Van Zyl (2012, 2014) and Tloubatla et al. (2016), it is further presumed that the broader student population speak an array of languages.

### **1.8. Data storage**

Both the primary (i.e. the online survey data) and secondary data (i.e. the retention status) is stored on a computer and storage device to which only the researcher and promoters have access. The data is and will be password-protected and kept in electronic format for five (5) years for auditing purposes; thereafter the data will be destroyed. Additionally, the permission requests and clearance letters are saved in a password-protected folder on a secure computer, to which only the researcher and promoters have access.

## **1.9. Data analysis techniques**

Prior to any inferential or hypothesis testing, the researcher assessed the psychometric rigour of the Grit-S scale by exploring the validity and reliability using factor and item analyses, respectively. Descriptive and inferential statistical analyses<sup>12</sup> were then employed to analyse the data according to the research design and questions.

### **1.9.1. Factor analysis**

Before proceeding to infer any results to the population, it was necessary to first establish whether the Grit-S scale demonstrated sufficient validity among the current sample. Firstly, the factorability of the eight Likert-scale items in the Grit-S scale was examined using two well-recognised criteria (Field, 2009): the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. An exploratory factor analysis (EFA) with an oblique rotation (oblimin) was then conducted to identify the grouping of items and the associated dimensions (Field, 2009). This was followed by a partial confirmatory factor analysis (PCFA).

While there is substantial evidence for the factor structure of the Grit-S scale (therein suggesting a confirmatory factor analysis – CFA), to date there are no psychometric reports available on the scale within a South African ODL context. In this regard, it was deemed necessary to first uncover the dimensions present in the questionnaire among a South African ODL sample. Against this, an exploratory factor analysis (supplemented by a PCFA) was justified.

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<sup>12</sup> Descriptive statistics summarise and describe a sample, whereas inferential statistics aim to draw conclusions about a population, based on the sample.

### **1.9.2. Reliability analysis**

To assess the reliability (i.e. the internal consistency) of the Grit-S scale, an item analysis was performed on the items within the identified factors, whereby Cronbach's (1951) alpha values were assessed. All variables within the identified factors were retained unless the removal of the item suggested the increase in the domain's reliability (i.e. increased Cronbach's alpha value). Items with Cronbach's alpha values below .60 were deemed unacceptable and were subsequently removed (Field, 2009). The results of the reliability analysis, together with those from the factor analysis, are presented in Chapter 6.

### **1.9.3. Descriptive analysis**

Frequency analyses were conducted to determine the demographic and retention profile of the sample. Descriptive statistics (means, standard deviations and values of skewness and kurtosis) were derived for the grit data, as well as for each factor. Additionally, descriptive statistics were adopted to assess the tenability of the parametric assumptions.

### **1.9.4. Inferential analysis**

In retention studies, the methods of inferential analysis have included discriminant analyses, multiple regressions, and other methods such as probit analyses and simple tabulations (Ott, Markewich, & Ochsner, 1984). However, if the dependent variable in a retention study is dichotomous<sup>13</sup>, Field (2009) and Ott and colleagues (1984, p. 440) have suggested that

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<sup>13</sup> Consisting of two categories, for example, retained and not retained.

“discriminant analysis and multiple regression are not the most appropriate methods of analysis”.

In the current study, the dependent variable (retention) is binomial. As such, the use of correlations and subsequent binary logistic regression models seemed appropriate to test the effects of the potential predictor (Field, 2009; Ott et al., 1984). Binary logistic regressions can be useful in understanding which independent variables, if any, are able to describe retention (Ott et al., 1984). In the event where significant results are revealed, the logistical analysis “also enables one to develop predicted probabilities of retention for each combination of the independent variables” (Ott et al., 1984, p. 440).

Two logistic regressions were planned, the first of which assessed grit as a stand-alone predictor. The second regression followed a hierarchical approach, entering the independent covariates in varying orders. The previous performance aggregates were entered into the first block, and grit as a composite score into the second. This allowed the researcher to determine whether grit contributes to the model after accounting (or controlling) for previous academic performance.

#### **1.10. Definition of key terms**

Having outlined the data analysis strategies, the focus shifts to a brief description of the approaches used to operationalise the core constructs, i.e. student retention and psychological grit.

### **1.10.1. Operationalising the dependent variable: student retention**

Student retention rates should not be confused with student completion or success rates (Mouton et al., 2015). Although the concepts of student success and retention overlap and are inextricably linked, the focus in this study was not to understand the performance of students, but rather sought to understand why students returned (or persisted), despite possible failure. As such, retention in the current study was operationalised as the proportion of students who successfully registered<sup>14</sup> (i.e. enrolled) in consecutive periods, irrespective of performance or degree completion status.

### **1.10.2. Operationalising the independent variable: psychological grit**

Psychological grit is typically operationalised as a “higher-order construct with two lower-order facets: perseverance of effort and consistency of interest” (Credé, Tynan, & Harms, 2016, p. 4). These two facets respectively refer to the tendency to work hard, despite adversity, and the tendency to sustain interest in specific, long-term goals (Credé et al., 2016). Combined, these measures give an overall grit score ranging between 1 = not at all gritty to 5 = extremely gritty (Duckworth & Quinn, 2009).

## **1.11. Outline of the chapters**

Chapter 1 presented a glimpse into the alarming retention rates within HEIs in South Africa in general, and specifically at UNISA, an overview of the predominant predictors in ODL, the research methodology and the data analysis techniques. Chapter 2 presents an in-depth

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<sup>14</sup> Students who cancelled their studies or had payment(s)/form(s) outstanding were considered ‘not retained’. Only those with finalised registrations were classified as ‘retained’.

literature review of the South African HE sector, both pre- and post-apartheid. In addition, the current challenges facing the sector are reviewed. Chapter 3 explores the predictors of student retention in HE, both within contact-based institutions and among those offering tuition at a distance. Chapter 4 outlines a chronological series of frameworks, commonly cited in HE literature, followed by the adopted framework, its critiques and benefits. Chapter 5 elaborates on the methodology and data analysis strategies employed in the current study, while Chapter 6 reveals the results from the descriptive and inferential analyses. Lastly, Chapter 7 positions the results in the current South African HE landscape and highlights the key limitations, contributions, and practical implications of the study.

### **1.12. Summary**

In light of the trends highlighted in this chapter, it is clear that one of the critical challenges facing UNISA as a high-quality, effective ODL provider is the improvement of its student retention rates (Prinsloo, 2009), especially among the honours cohorts (Barnes & Van Zyl, 2016). Although retention has been studied within the South African ODL context, research pertaining to grit and its relative explanatory value at UNISA is virtually non-existent. With many local and international studies highlighting the adverse effects associated with a reduction in retention rates, additional research in this area may add to our understanding of student persistence, not only among honours students at UNISA, but within the field of ODL.

## **CHAPTER 2: HIGHER EDUCATION IN SOUTH AFRICA**

Before discussing the commonly cited factors influencing retention among ODL students, it is imperative to first position the current study in the South African HE landscape and highlight the inherent complexities. This chapter, therefore, provides an overview of the sector and its governing bodies, the structure and shape of the public HE sector pre- and post-apartheid, together with the size and composition of the student populations. In addition, the challenges facing the South African public HE sector and the negative implications associated with such are discussed.

### **2.1 An overview of the South African Higher Education landscape**

As alluded to in Chapter 1, South Africa's HE system is plagued with academic under-preparedness, lack of epistemological access, and first-generation status, all of which have been attributed to the legacy of the apartheid policies and legislature (Letseka, 2009; Nekhwevha, 1999). As an ongoing consequence, the South African HE landscape has been described as “a low participation, high attrition system” with success rates “sharply skewed by race and prior education” (CHE, 2016, p. 7).

#### **2.1.1. Governance of public Higher Education**

While the core inheritances of the South African HE landscape cannot be ignored, the HE sector is more unified in terms of its governance, quality assurance processes and qualification frameworks when compared to its fragmented apartheid past (CHE, 2016). These are discussed next.

## *Pre-1994*

During 1984, the apartheid government protracted the marginalisation of its African citizens by promulgating a new constitution for the Republic of South Africa (RSA), which divided the national parliament into three chambers (Bunting, 2006). These comprised the House of Assembly for white citizens, the House of Representatives for coloured citizens, and the House of Delegates for Indian citizens (CHE, 2004). No provision was made in this regard for any representation of African citizens, despite African citizens constituting at least 75% of the population (Bunting, 2006).

A salient component in the establishment of these three chambers was a distinction drawn between *own affairs* and *general affairs*. Education in the RSA at this time, be it primary, secondary or tertiary<sup>15</sup>, was considered an *own affair* as far as whites, coloureds and Indians were concerned (Bunting, 2006). This implied that higher education for the respective ethnicities was governed by each of the three newly established chambers of parliament. However, higher education for Africans was considered a *general affair* and therefore resided in a *general affairs* government department which was termed the 'Department of Education and Training' (DET) (Bunting, 2006).

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<sup>15</sup> Primary education includes Grade 1–7 in South Africa (internationally: elementary/early years of middle school); Secondary education includes Grades 8-12 in South Africa (internationally: high school/latter years of middle school); and Higher education in South Africa includes tertiary studies (internationally: community colleges, universities).

## *Post-1994*

It was only with the advent of the first democratic election in 1994 that a new government was established, one with a priority to redress past inequalities in the higher education sector (Ministry of Education, 2001). According to the National Plan for Higher Education (NPHE), the intention of the newly-established South African government was now to promote equity of access and fair opportunities, to allow those citizens who wished to do so to fulfil their potential through higher education (Ministry of Education, 2001). In outlining the governance framework for public HEIs, the Higher Education Act was promulgated (CHE, 2004, p. 41).

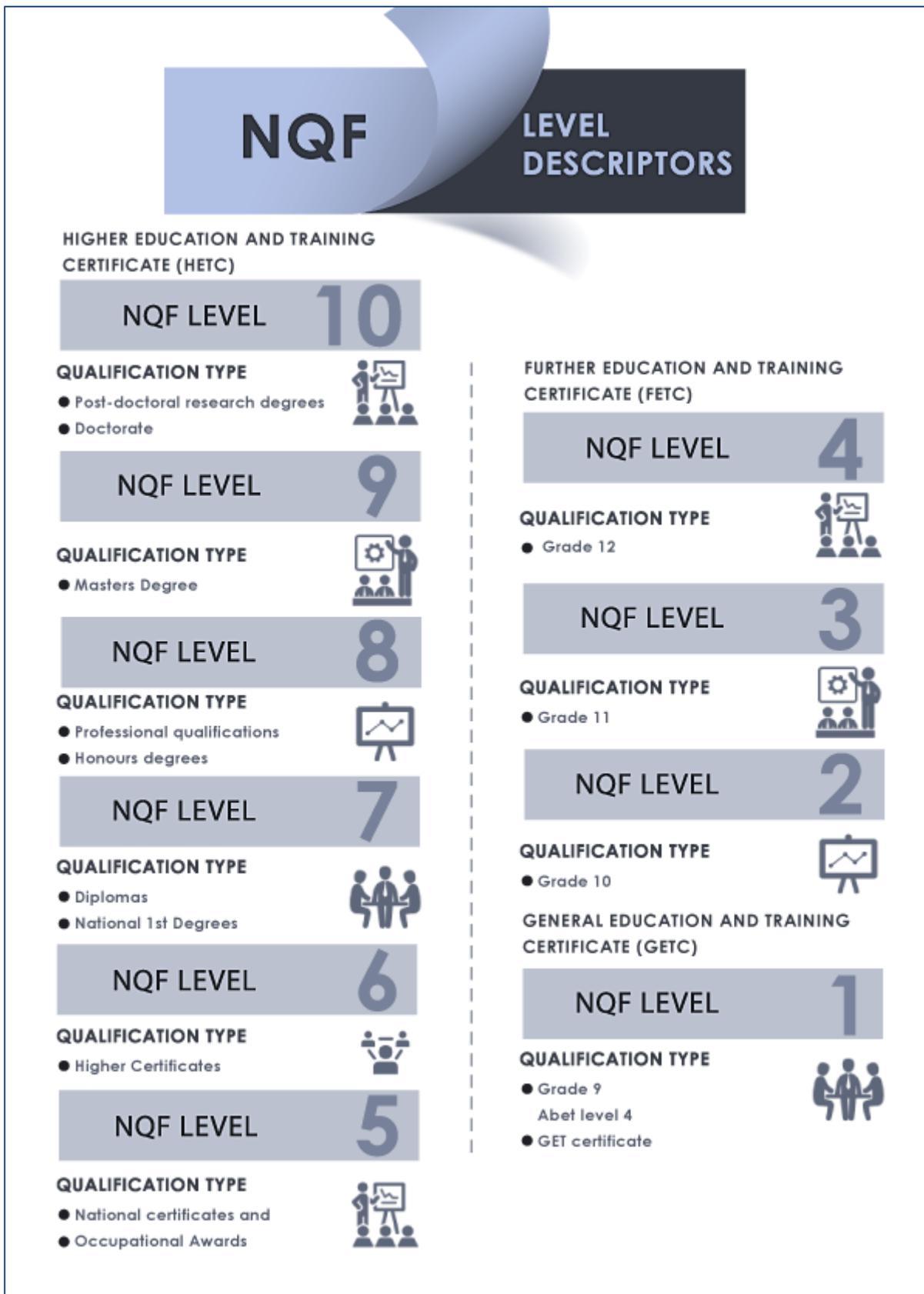
### **2.1.1.1. The Higher Education Act and statutory bodies**

The Higher Education Act (Act 101 of 1997) was promulgated to promote quality tertiary education beyond high/secondary school. It regulates the higher education sector in South Africa and provides for the establishment, governance and funding of public HEIs (The Higher Education Qualifications Framework, 1997). The Act provides for the appointment of an independent assessor, transitional arrangements, and for the repeal of certain laws (Act 101 of 1997). Furthermore, it makes provision for the establishment of the Council on Higher Education (CHE).

The CHE is an independent statutory body that was established in 1998 in terms of the Higher Education Act described above. The CHE is responsible for advising the Minister of Higher Education on all matters pertaining to HE in South Africa, in order to bring equity and quality into the system (CHE, 2004). The South African Qualifications Authority (SAQA) was similarly established to oversee the development and implementation of the

National Qualifications Framework (NQF) (Act 67 of 2008), which seeks to ensure the national standard (and recognition) of South African qualifications.

The NQF recognises three categories of education and training in South Africa: General education and training (GET), Further education and training (FET), and Higher education and training (HET). Within these broad categories, the NQF outlines ten sub-frameworks (and qualification types). The first four levels (i.e. NQF 1–4) pertain to student achievement in the general and further education and training categories, with NQF4 representing matric/grade 12 completion. NQF levels 5 to 10 relate directly to higher education achievement, with doctorate studies at NQF10, master's at NQF9, and honours degrees at NQF8. This is shown in Figure 4 below.



*Figure 4: NQF level descriptors*

Source: SafeSkill, n.d.

Together, these statutory bodies (and their respective frameworks) are responsible for quality assurance, effective and efficient management, and the general development of the sector (CHE, 2004). In addition, these statutory bodies are also responsible for providing recommendations on the optimal size and shape of the HE system. This is discussed below.

### **2.1.2. The shape and structure of the public Higher Education landscape**

The higher education sector's shape and structure in South Africa is in many respects deeply distinct from its restricted and insular apartheid inheritance (CHE, 2016). This is elaborated on below.

#### ***Pre-1994***

Prior to 1994, the higher education system comprised 36 public HEIs, all of which were structured along racial lines (CHE, 2004). Of the 36 institutions, 17 were reserved for white students (four English-medium universities, six Afrikaans-medium universities, and seven technikons); 13 were reserved for African students (six universities and five technikons located in *Bantustans*<sup>16</sup>, and two urban universities); and four were reserved for coloured and Indian students (two urban universities and two technikons). A further two distance education providers catered for all ethnicities, one of which was UNISA (CHE, 2004, p. 40).

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<sup>16</sup> Bantustans were (partially) self-governing areas set aside during the apartheid era for African people. Bantustan areas included the Transkei, Bophuthatswana, Venda and Ciskei, formerly referred to as the 'TBVC states'.

## *Post-1994*

Post-1994 brought with it a vital restructuring of the higher education sector which saw the creation of new institutions and the disappearance of old ones (CHE, 2016). Thirty-six institutions were reduced to 23 through a process of restructuring involving incorporations and mergers (CHE, 2010a; Sommer, 2013). The restructuring resulted in eleven universities, six universities of technology (merger between two former technikons), and six comprehensive universities (merger between a university and a technikon)<sup>17</sup> (CHE, 2010b; DHET, 2017b). In 2014, two new universities were established, one in Mpumalanga and the other in the Northern Cape, namely the University of Mpumalanga and Sol Plaatje University respectively. A year later, the Sefako Makgatho Health Sciences University<sup>18</sup> opened, which saw the number of public HEIs increase from 23 to 26 institutions (DHET, 2017b).

As a result of the incorporations and mergers, access to all universities was expanded and equal opportunities were now provided to historically disadvantaged students (Sommer, 2013). Subsequently, the demographic profile of tertiary students started to change, departing considerably from apartheid's intentions (Bunting, 2006). This is briefly highlighted below.

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<sup>17</sup> Traditional universities: Offer qualifications from the three-year Bachelor's degree to doctoral level qualifications with a strong focus on postgraduate and research activities; Comprehensive universities: Offer qualifications from the higher certificate to doctoral levels with some related research activity; Universities of technology: Offer predominantly undergraduate qualifications with some postgraduate and research activity, all with a strong focus on industrial and technological disciplines (CHE, 2016).

<sup>18</sup> Previously known as Medunsa (Medical University of South Africa).

### **2.1.2.1. The student population in public HEIs in South Africa**

The majority of students were no longer white or male students; there were now more African and female students enrolling in tertiary studies (CHE, 2010a; DHET, 2017b). By 2002, there were 404,000 African students enrolled in public HEIs, representing an exponential growth from the 191,000 in 1993 (CHE, 2010a), and by 2006, 75% of the students were African and half were female (Van Zyl, 2010).

The same trend is evident among the students enrolled in public HEIs in 2015; of the 985,212 students enrolled in public HEIs in 2015, 71% were African and 58% were female (DHET, 2017b). This is viewed as one of the most notable accomplishments in the post-apartheid era, particularly as most HEIs now have a majority of female and African students in their complements (CHE, 2015).

## **2.2 The challenges facing Higher Education in South Africa**

Notwithstanding these evident triumphs in the post-apartheid era, the pre-1994 legacy outlasted the legislative changes and continues to shape and influence the sector in less desirable ways. The stresses exerted by the apartheid regime, the challenging socio-economic context and the academic under-preparedness of students continue to place pressure, not only on the retention of those entering, but also on the quality of the system as a whole (CHE, 2016). These are discussed below.

## 2.2.1 Education during the Apartheid era

### *Primary and secondary education*

Prior to 1994, which saw the demise of the apartheid era, access to primary and secondary schooling was legislated according to racial lines. The Bantu Education Act in 1953 (Act 47 of 1953), the Coloured Persons Education Act in 1963 (Act 47 of 1963), and the Indians Education Act in 1965 (Act 61 of 1965) were legislated into existence, all of which enforced racially-separated educational facilities (Moore, 2015; Morrow, 1990). Seeking to serve the interest of the white supremacy, four separate schooling systems were established (one for each ethnic group).

The Bantu Education Act (Act 47 of 1953) was to make sure that our children only learnt things that would make them good for what the government wanted: to work in the factories and so on<sup>19</sup>; they must not learn properly at school like the white children. Our children were to go to school only three hours a day, two shifts of children every day, one in the morning and one in the afternoon, so that more children could get a little bit of learning without government having to spend more money (Baard & Schreiner, 1986, p. 1).

Along any dimension of comparison, blatant inequalities existed between the four schooling systems (Morrow, 1990). Not only were non-white learners denied access to equal educational opportunities and resources, but they had to endure overcrowded classrooms (in

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<sup>19</sup> Courses such as cardboard modelling, gardening, carpentry, rudimentary agriculture, basket making, mat weaving, and brick making were standard training for boys, while girls underwent courses in sewing, needlework, and domestic work (Loram, 1917).

dilapidated buildings) and inadequate instruction from poorly trained teachers. Enormous disparities in funding between the four systems also adversely affected the quality of education for those attending non-white schools (Hartshorne, 1992). Perilously, this segmented infrastructure in both primary and high school continued to create a divide in terms of access to quality tertiary education.

### *Tertiary education*

As was the case above, access to tertiary education and resource allocation during the apartheid era were also legislated according to racial lines (Van Zyl, 2010). Although university access was not restricted to a particular group, there were limitations on the HEIs to which different ethnic groups could be admitted (Sommer, 2013). All public HEIs were designated for particular ethnic groups, and students from other ethnic groups could not be admitted into a different institution without obtaining special permission from the governing department of the institution (CHE, 2004).

This segregation led to the establishment of two broad spheres of institutions, those reserved for white South Africans (historically advantaged universities, HAUs), and those tasked with providing limited tertiary education to those who were not classified white (historically disadvantaged universities, HDUs) (CHE, 2000, 2010a; Van Zyl, 2010). These universities included ten HDUs and seven historically disadvantaged technikons designated for the use of black (African, Coloured and Indian) South Africans, while ten HAUs and seven historically advantaged technikons were designated for the exclusive development of white South Africans (Bunting, 2006). A further two distance institutions catered for all races, one of which was UNISA (Bunting, 2006).

Moreover, the different legal status and the racial basis of the sector led to substantial differentiation in governance and funding subsidies (CHE, 2004). HDUs and technikons were often under-resourced and under-funded (Sommer, 2013). “Not only was the resourcing of these institutions inequitable, but the range of programmes offered reflected assumptions about the kind of careers for which students of different races were being prepared” (CHE, 2010a, p. 2). For female students, this meant training primarily in home economics (i.e. cooking, laundry work, and sewing), while male students were taught tree-planting, heavier agriculture, road-making, plumbing and carpentry (Loram, 1917).

HAUs and technikons, in contrast, were not only better funded by the apartheid government, but also had access to more resources and offered a more extensive range of qualifications (CHE, 2016). These institutions also selected only the best students whereas the HDUs depended mostly on walk-ins (Van Zyl, 2010). As a result, HAUs had better rates of student participation, preparedness, success, and retention (Van Zyl, 2010).

### **2.2.2 Academic under-preparedness**

The South African higher education intake is increasingly characterised by academically under-prepared students (Van Zyl, 2010), a key contributor to the dismal retention and throughput rates in higher education (CHE, 2010a; Fisher, 2011; Lewin & Mawoyo, 2014; Scott et al., 2007). Noted as a consequence of the ongoing legacy of apartheid and a predominantly substandard schooling system (as described in Section 2.2.1), academic under-preparedness “often involves a complex of factors such as conceptual development, academic language proficiency and approach to learning, as well as subject knowledge” (Scott et al., 2007, p. 44). Du Plessis and Gerber (2012, p. 81) provide a similar description,

noting that “academic under-preparedness results from a combination of a lack of English proficiency, mathematical ability, and effective study skills”.

Seeking to assess the state of academic preparedness among first-year tertiary students in South Africa, Higher Education South Africa (HESA)<sup>20</sup> launched the National Benchmark Test Project (NBTP) in 2005. The NBTP and its subsequent test (National Benchmark Test: NBT) is one of only two national assessments currently administered in South Africa; the other being the national school leaving examination, the National Senior Certificate (NSC). The NBT reflects to what extent a school-leaver who is applying to university is prepared for the core academic literacy, quantitative literacy and mathematical demands of tertiary study (Bohlmann et al., 2015; Du Plessis & Gerber, 2012), while the NSC reflects to what extent a Grade 12<sup>21</sup> student has met the requirements of the final year curriculum.

Results from the pilot study of the NBTP revealed the state of (under) preparedness among students entering tertiary studies; less than half (47%) of the students who completed the NBTs during 2008 were proficient (i.e. able to cope without extra assistance) in English, while only 7% were proficient in mathematics (MacGregor, 2009). Recently released NBT results from the 2015 intake have alluded to the point that, although an increase is evident, the percentage of proficient candidates in quantitative literacy (QL) and mathematics (MAT) is still quite low, with 11% each (Bohlmann et al., 2015). The percentage of proficient academic literacy (AL) candidates – although higher than the QL and MAT – decreased to approximately 29% (Bohlmann et al., 2015). It has been noted that this under-preparedness among students in South African HEIs is a consequence of dysfunctional secondary

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<sup>20</sup> Now known as Universities South Africa.

<sup>21</sup> The final year of secondary/high school.

schooling, with many deficiencies and inequalities still present today (Development Bank of Southern Africa, 2008; Scott et al., 2007; South African Human Rights Commission, 2006).

### **2.2.2.1 Academic under-preparedness at UNISA**

Although the efficacy of the NBTs has been established among residential universities, findings on the NBTs and their use in South African ODL settings are virtually non-existent. In this regard, the relevance, validity, reliability and practicality of applying the NBTs at UNISA has been widely debated (Swanepoel et al., 2011). According to Swanepoel et al. (2011), the unavailability of a sufficiently large enough item bank precludes the online administration of the NBTs at UNISA. In addition, Phewa (2013) suggests that the NBTs are pitched at an academic level beyond that of a UNISA student, and rather than clearly highlighting the areas of academic concern in need of support, the NBTs only categorise students into proficient, intermediate and basic streams. This provides limited diagnostic data to inform intervention and support efforts.

Accordingly, UNISA fostered the establishment of the Responsible Open Admission Project (ROAP)<sup>22</sup>, which was designed to assess the logistical viability of large-scale testing and to determine the level of academic preparedness among UNISA students (Swanepoel et al., 2011; Van Schoor, 2010). Falling under the auspices of the ROAP, Van Schoor (2010) utilised the Academic Literacy Test (ALT) from the Standardised Assessment Test for Access and Placement (SATAP)<sup>23</sup> to assess the academic literacy of UNISA students. Van Schoor (2010) sampled students who intended to register for an LLB degree in 2008 with

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<sup>22</sup> Initially referred to as the Managed Open Admission Project (MOAP).

<sup>23</sup> The ALT of the SATAP was developed to determine whether a student is competent to respond to the reading, thinking and reasoning demands required of higher education. Cut-off points can then be used to distinguish levels of academic preparedness (Scholtz & Allen-ile, 2007).

the College of Law (CLAW;  $n = 999$ ). Results revealed that 39% ( $n = 812$ ) of the students were deemed academically prepared (in terms of their AL) and therefore required no additional support at UNISA. On the other hand, 15% ( $n = 308$ ) were classified as under-prepared and deemed suitable for additional, intensive support (Van Schoor, 2010). The results further revealed that 46% ( $n = 947$ ) of the sample were partially prepared<sup>24</sup> and with adequate support, should be able to function within an ODL environment (Van Schoor, 2010).

More recently, Phewa (2013) developed a tool to assess academic literacy among UNISA students, using the same skills and competencies that the NBTs assess. However, it differs from the NBTs in that the skills assessed are grouped into what are referred to as skills clusters (Phewa, 2013). Results are provided in such a manner that for each skills cluster, a percentage performance for each student is highlighted, indicating exactly where the skills gaps lie. The tool, known as the Academic Literacies Diagnostic Assessment Tool (ALDAT), measures 13 proficiency skills, categorised into seven skills clusters. The latter are grouped into linguistic, discourse, and visual and numerical competencies.

Using this tool, Phewa (2013) sampled students in the College of Economic and Management Sciences (CEMS) who had enrolled in specific modules<sup>25</sup> to pilot the instrument. While performance on the ALDAT was not significantly correlated with final examination results, results from the pilot studies suggested that under-prepared students had areas of academic concern, as did those who were deemed academically prepared, albeit hidden by their overall achievement scores (Phewa, 2013). Of the 340 students who wrote

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<sup>24</sup> Demonstrated basic academic preparedness.

<sup>25</sup> ACN203S (Cost accounting and control), DSC1630 (Introductory Financial Mathematics), ECS1501 (Economics), TAX1501 (Taxation of Salaried Persons), FIN2601 (Financial Management).

the final examination, only 197 students passed, whereas 283 students, according to the results of their diagnostic test, were academically prepared (Phewa, 2013).

While it has been suggested that students' level of preparedness for HE changes over time and that a certain level of preparedness does not in itself predetermine the chances of completing a qualification (Ozga & Sukhnandan, 1998), the state of academic under-preparedness among UNISA students is a crucial factor contributing to the poor retention rates (CHE, 2016; DHET, 2012). Moreover, since UNISA's student body represents about one-third of South Africa's total higher education intake, this under-preparedness has significant implications for overall graduate output in the country (CHE, 2013).

#### **2.2.2.2 Language of Learning and Teaching (LoLT) at UNISA**

Potentially compounding the issue of academic preparedness among UNISA students is the language of learning and teaching (LoLT) at the institution. According to Alidou et al. (2006), if efficiency of learning and cognitive development are the ultimate goals, the mother tongue should then be the medium of instruction from primary school, through secondary school and into university. Lamentably, this is not the case among South African HEIs, nor at UNISA, and continues to place strain on the sector.

Although UNISA's Language policy supports the development of the other official South African languages<sup>26</sup>, the policy clearly states that "the LoLT in all undergraduate courses will be English, with scaffolding in other official languages" (UNISA, 2016b, p. 3).

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<sup>26</sup> Afrikaans, isiNdebele, isiXhosa, isiZulu, Sepedi, Sesotho, Setswana, siSwati, Tshivenda, and Xitsonga.

Similarly, the policy stipulates that “all formal study material, formative and summative assessment, as well as other formal tuition activities will be in English only<sup>27</sup>, whereas learner support activities *may* be in the language of the student” (UNISA, 2016b, p. 4). Paradoxically, the same policy mentions, *on the first page*, that “students who study in their own language are generally more successful (in their studies) than students studying in an additional or second language”.

Given a 30% slower reading rate for second language readers, it is anticipated that second language students at UNISA read approximately 160 words per minute (Pretorius, 2000). However, as Pretorius (2000, 2002) indicates, the average reading speed reported among second language speakers at UNISA stands at 96.9 words per minute, with the minimum speed of 53 words – and a maximum speed of 151 words per minute – the latter of which still remains lower than that anticipated (Pretorius, 2002, 2002). With reading ability being strongly linked to academic performance among UNISA students, accounting for 24% variance (Pretorius, 2000), the negative impact of the LoLT on second language speakers at the institution remains a formidable challenge and requires reappraisal.

### **2.2.3 Financial challenges**

The financial cost of taking part in higher education in South Africa is prohibitive for many poor, disadvantaged students (Van Zyl, 2010). Mostly to blame are the socio-economic inequalities in the South African society and the past apartheid history (Scott et al., 2007; Van Zyl, 2010). As a result of widening participation and increasing equity post-apartheid

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<sup>27</sup> According to the student rules, on the other hand, the university provides tuition, in some cases, in either Afrikaans or English (according to the preference of the student).

(see Section 2.1), the government substantially increased the funding for student loans and bursaries, mainly through the National Student Financial Aid Scheme (NSFAS) (Scott et al., 2007; Van Zyl, 2010). This is elaborated on next.

### **2.2.3.1 The National Student Financial Aid Scheme (NSFAS)**

NSFAS was created through an Act of Parliament “to provide a sustainable financial aid system for study loans and bursaries for academically deserving and financially needy students” (DHET, 2013, p. 36). Created in 1999, NSFAS still plays a significant role in providing access to tertiary students who otherwise would not have been able to attend university under the prevailing economic circumstances (DHET, 2013).

Using technical and vocational education and training (TVET) colleges to provide a snapshot, disadvantaged students in these HEIs have not had to pay tuition fees since 2011 and have been assisted with accommodation and/or transport costs (DHET, 2013). More recently, NSFAS committed to paying the tertiary registration fees for those who qualified for the scheme (Peyper, 2016). According to the White Paper for Post-school Education and Training, the government remains committed to gradually extending this (and additional tuition costs) to other university students as resources become available (DHET, 2013).

However, as the White Paper rightly indicates, there is mounting concern to assist those students whose parents’ income is too high to qualify for NSFAS funding, but too low to qualify for loans from banks, “the missing middle”<sup>28</sup> (Chernick, Exstrum, & Molosankwe,

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<sup>28</sup> Those students who are deemed too rich to qualify for government support, but too poor to afford tuition fees.

2016, p. 1; DHET, 2013, p. 8). While concerted efforts are targeted at meeting the needs of this particular group of students (Chernick et al., 2016, p. 1; DHET, 2013, p. 8), concerns raised have alluded to the fact that very few NSFAS students (and other funded students), if any, receive full funding for their tertiary studies from the scheme (Stumpf, 2010). As Statistician-General Pali Lehohla rightly indicates, funding for students must cover expenses beyond tuition if they are to succeed at tertiary institutions (Bateman, 2017).

#### **2.2.3.1.1 Deficiencies in the scheme**

This section would not be complete without mentioning some of the more crucial implementation and administrative deficiencies of the system that continue to plague the HE sector. Recently, Seale (2018) reported that NSFAS's lack of technological capacity, often leading to inaccurate data, is of substantial hindrance to the effective implementation of the scheme. In the same article, the Minister of Higher Education stated:

The data that NSFAS presented in its reports is confusing, sometimes inaccurate, and shows that the core data integration challenges remain. This has brought to light the continuing inefficiencies in the entity's business processes and the inability of the entity to implement the DHET bursary scheme effectively (Seale, 2018, p. 1).

Similarly, administrative issues are concerned with the slow (and inaccurate) generation of bursary agreements and the staggered progress in paying allowances to students who have qualified for funding (Seale, 2018). According to the newspaper article by Seale (2018, p. 1), "the implications for the administrative deficiencies are dire", with some students dropping out despite qualifying for NSFAS funding.

### **2.2.3.2 Application and acceptance fees**

Application fees and admission/acceptance fees also form part of the financial (and NSFAS) challenges experienced by many students in South Africa. Non-refundable application fees – previously-implemented in numerous South African HEIs – limited the number of institutions to which disadvantaged students could apply (DHET, 2013). To alleviate this constraint, the DHET proposed the Central Applications Clearing House (CACH). The CACH omits the laborious and expensive task(s) associated with multiple university applications by accepting one application fee and facilitating applications to more than one institution (if necessary). On this note, the CACH promotes greater equity of access for tertiary students, but mainly for the poor, for whom numerous application fees were a barrier.

In addition to application fees, HEIs required students to pay an acceptance fee following a successful application. UNISA's students were not exempt from an application or acceptance fee. Although UNISA's application fee was lower, the newly announced acceptance fee introduced in 2015 (Etheridge, 2015) was substantially higher when compared to other South African HEIs (R1,020.00 vs R500.00 at the University of Kwa-Zulu Natal and R750.00 at the University of Fort Hare). Although the acceptance fee at UNISA was intended to ensure students took up their places at the institution (Etheridge, 2015), it resulted in ongoing student protests at the university. Students voiced their dissatisfaction with the acceptance fee together with changes to the re-admission policy (Etheridge, 2015). Against the backdrop of these concerns raised by the Student Representative Council (SRC), Prof Mandla Makhanya (UNISA's Vice-Chancellor) aborted the acceptance fee. Having said this, it is important to note that costly and disruptive student protests, mostly relating to financial challenges, have become an enduring hallmark of the

South African HE sector (CHE, 2016), many of which still continue today (Kubheka, 2019; Ngqakamba, 2019; Sisetsha, 2019).

#### **2.2.4 First-generation students**

There are many first-generation students (FGS) in South Africa, given its previous political dispensation (Moodley & Singh, 2015). Lehohla (2017) revealed that close to 70% of tertiary students in South Africa in 2016, between the ages of 20 and 34 years, were FGS (defined as a student for whom HE is the first family experience). In addition to being the first in the family to attend HE, three-quarters of African students and close to 70% of coloured students aged 20 to 34, were the first in their families to graduate from high/secondary education (Lehohla, 2017).

It has been noted that FGS tend to face significant challenges in HE when compared to their counterparts (Prinsloo, 2009). The psychological pressures of being the first in the family to attend HE, coupled with the demands of tertiary study, make it more difficult to cope and often lead to dropout (Moodley & Singh, 2015). On this note, Letseka (2009, 2015) and Letseka et al. (2009) revealed that approximately 70% of the students who withdraw from HE in South Africa have no siblings with university experience and are less academically prepared. It has been suggested that these students lack the kind of information and guidance to navigate and cope with the complex HE administration systems and policies, be it contact or distance education environments (Letseka, 2009, 2015; Letseka et al., 2009). There is also less understanding from family and friends of the pressures faced in HE, together with the time and effort required to succeed.

Having discussed the broader challenges imposed on the South African HE landscape, the attention now shifts to the negative implications associated with such, for the government, the institution and the student. These include a lack of skilled labour in the South African economy, a loss of revenue and government subsidy for the institution, personal damage inflicted on the student by the failure of the experience in HE, and a loss of stakeholder trust for the institution and student alike (Archer et al., 2014; Van Zyl, 2010).

### **2.3 Negative implications associated with the inherent complexities of the South African Higher Education landscape**

Most governments spend considerable sums of money to fund students in HEIs annually and naturally, when students are not retained, significant portions of this money are lost (Freer-Weiss, 2004; Van Zyl, 2010). The South African situation is no exception. A report released by the Human Sciences Research Council (HSRC) (Letseka & Maille, 2008), illustrated the cost of student non-completion in South Africa. Using the 2000 entering cohort in their study, results revealed that only 22% had graduated within the specified three-year duration for a generic Bachelor's degree. In three years, 50% had dropped out. These dropouts, seen as an investment without a return, cost the South African National Treasury R4.5 billion in grants and subsidies (Letseka & Maile, 2008, as cited in Moodley & Singh, 2015). Against this backdrop, the DHET indicated that it would only distribute future teaching (and research) grants on the basis of approved plans to increase retention and success, with demonstrably effective initiatives (De Swardt & Marx, 2013; Swanepoel et al., 2011).

HEIs also suffer financially when their students are not retained, losing revenue in the form of tuition fees, substantial grants, and output subsidies from the government (Archer et al., 2014). When HEIs allocate these government grants and subsidies to students who are

ultimately not retained, financial wastage is the product, negatively impacting the financial viability of the institution (Van Zyl, 2010). Moreover, no return on investment (i.e. output subsidies, graduating student) exacerbates the situation, which, in turn, adversely affects the institution's reputation as well as staff and student morale (Swanepoel et al., 2011).

As well as diminished morale, non-completion has other significant psychological implications for students. Students often experience a variety of negative emotions, such as feelings of failure and disappointment (Kahn, Nauta, Gailbreath, Tipps, & Chartrand, 2002), loss of self-esteem, confidence, and motivation (Longden, 2002), and anguish and pain (Longden, 2002, 2004). These feelings often perpetuate the discouragement from re-registering (Poellhuber, Chomienne, & Karsenti, 2008).

In addition to the psychological implications associated with non-completion, students (and their families) also suffer financially and may be in debt, due to money invested in tuition, textbooks, res. (i.e. residence on or near campus), transportation and other related costs. A student's immediate family fits into this category because they are usually involved in providing pivotal social and financial support to the student and have vested interest in the outcome of the student's involvement in HE (Longden, 2002).

## **2.4 Summary**

“The higher education sector in South Africa today is as much a creature of its past as it is a creature of sustained effort, through policy, legislation and institutional restructuring, to redirect and transform it” (CHE, 2016, p. 5). On the one side of the South African HE landscape, the creation of a culture of sustained efforts and transformation aimed at widening

participation, increasing funding, and promoting greater equity of access and development to disadvantaged students, is evident.

On the other side of the landscape, there is a legacy which far outlasted legislative changes. There are many HE students who are disadvantaged, who lack the financial means, are academically under-prepared for tertiary study and, in most cases, are FGS who have little or no access to social networks with reservoirs of HE experience (Slonimsky & Shalem, 2006, p. 35). Moreover, there are many students who lack the necessary epistemological access (Letseka, 2015). This two-fold concept suggests that students should not only learn how to become participants in academic environments, but that institutions should provide the necessary access to the knowledge, information, and resources that they possess to ensure this epistemological access is achieved (Morrow, 1994).

While solutions to these challenges are multi-layered, with no immediate short-term fixes (Moodley & Singh, 2015), the need to predict the retention of students, thereby enabling the development of pre-emptive intervention strategies, cannot be precluded (Simpson, 2006). The following chapter therefore provides a literature review of retention predictors, in both contact-based and distance education settings.

## **CHAPTER 3: PREDICTORS OF STUDENT RETENTION IN HIGHER EDUCATION**

Before delving into the commonly cited predictors<sup>29</sup> of retention amongst ODL students, a broad overview of the predictors in contact-based HEIs is provided. This chapter therefore commences by highlighting both predictors of success and retention in traditional HEIs, before drilling down to the specific factors influencing retention among distance learning students. These predictors are reviewed from both an international and local perspective, and in terms of their strengths and weaknesses. The chapter concludes by suggesting a potential missing piece of the puzzle.

### **3.1 Predictors of student success and retention in contact-based institutions**

Entrenched in any tertiary education realm is the need to predict the success and retention of students, thereby enabling the development or enhancement of pre-emptive intervention strategies aimed at retaining students (Simpson, 2006). Predictors of success and retention have traditionally been divided into academic and non-academic factors, or non-cognitive factors (McKenzie & Schweitzer, 2001). The former are often operationalised using previous academic performance or university entrance examinations. The latter, on the other hand, are further divided into psychosocial predictors (McKenzie & Schweitzer, 2001) and distinguishing factors, which are events or student attributes outside the control of the institution. Often, these are not readily amenable to institution intervention or action (Tinto & Pusser, 2006).

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<sup>29</sup> Not to be confused with causality. See Footnote 6 (p. 11) about the distinction between causality and prediction.

Earlier studies in contact-based HEIs focused on academic factors as the focal predictors of student success and retention, and rightly so. Both anecdotal and empirical evidence has suggested that the constructs are positively and significantly related (Ashby, 2004; Bean, 1985; Cabrera & Hengstler, 1990; Cabrera, Nora, & Castaneda, 1993; Pantages & Creedon, 1978; Rickinson & Rutherford, 1996; Robbins, Oh, Le, & Button, 2009; Tinto, 1975). However, at most, these studies reported that academic factors (such as previous academic performance) accounted for half of the variance in retention and success rates. Providing a possible explanation, although dated, is the work of Kember and Harper (1987) which suggests, as McKenzie and Schweitzer (2001) and Tinto (2007) did, that high academic performance (in previous courses, entrance examinations, etc.) is not necessarily indicative of future retention or success, nor is poor academic performance indicative of attrition or future failure.

### **3.1.1. The overlap between the predictors of success and the predictors of retention in contact-based institutions**

An overlap between the major predictors of success and retention is evident in both international and local literature. Academic factors such as English proficiency (in Grade 12/matric), overall high school achievement, SAT and ACT scores, and previous course performance are consistently reported to be significant predictors of both success and retention within contact-based settings (Astin, 1997; Behr, 1985; Eiselen & Geysler, 2004; Grebennikov & Skaines, 2008; Jawitz, 1995; Koen, 2007; Lourens & Smit, 2003; Murtaugh, Burns, & Schuster, 1999; Peltier, Laden, & Matranga, 2000; Tross, Harper, Osher, & Kneidinger, 2000).

Non-academic or non-cognitive factors such as gender, age, race, and socio-economic status (SES) have also been widely studied and found to be significant indicators of both success and retention among contact-based tertiary students (Astin, 1997; Gorinski & Abernethy, 2007; Koen, 2007; Lourens & Smit, 2003; Murtaugh et al., 1999; Peltier et al., 2000; Tross et al., 2000). Together with these demographic attributes, psychosocial constructs (such as motivation, commitment, positive mental attitude, self-efficacy, self-confidence and self-control) have also been cited in the literature as indicators of success and retention (Boyer & Sedlacek, 1988; Brooks & DuBois, 1995; Morrow & Ackermann, 2012; Sommer, 2013; Wolfe & Johnson, 1995). According to an analysis by Peltier et al. (2000), not only are the aforementioned non-academic/non-cognitive attributes significant predictors in isolation, but the interaction between them also influences student outcomes within contact-based institutions.

### **3.2 Predictors of student retention in distance education settings**

Having briefly outlined the factors emanating from contact-based institutions, the focus now shifts to outlining those which predict retention exclusively, within an ODL setting. Regrettably, these sources are scarce in the South African HE setting – even more so when seeking those that permeate the ODL environment (Lourens & Smit, 2003; Prinsloo, 2009; Simpson, 2013; Van Schoor, 2010).

Simpson (2013) highlighted the scarcity of literature among ODL settings by illustrating the limited occurrence of the word *retention* in journal titles published in the International Review of Research in Open and Distributed Learning<sup>30</sup> (IRRODL) (Simpson, 2013).

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<sup>30</sup> Previously known as The International Review of Research in Open and *Distance* Learning.

During 2013, only three issues contained the word *retention* in the journal titles, and currently only five journal titles include the word. According to Simpson (2013, p. 105), “this is consonant with the general level of attention paid to the problem of student retention in distance education research”. Nonetheless, the available literature, however meagre, provides the background to the current study. This literature is discussed next.

### **3.2.1 Previous academic performance**

Using discriminant analysis, Dupin-Bryant (2004) identified pre-entry variables that distinguish individuals who were retained in online distance education courses (to the point of completion) from those who were not. Results revealed that seven pre-entry variables (in combination) significantly predicted ‘retention’ (defined as course completion or course non-completion). It must be noted that, although attempting to measure retention, the study by Dupin-Bryant (2004) examined course completion, somewhat more consonant with the concept of success rather than retention. Nonetheless, the identified predictors included: cumulative GPA, class rank, previous courses completed online, years of computer experience, operating systems and file management training, internet applications training, and ‘searching the internet’ training. However, the results of the discriminant analysis suggested that these seven variables accounted for only 9% of the variability in course completion, leaving 91% of the variance unexplained. The small variance explained may be due to an inappropriate method of analysis – as Ott et al. (1984, p. 440) rightly suggest, when the dependent variable is dichotomous in nature, “discriminant analysis and multiple regression are not the most appropriate techniques”, and may yield blurred results.

Recently, using a sample of undergraduate students ( $n = 2,314$ ) in online courses, Cochran et al. (2014) identified prior academic performance (cumulative GPA) and class standing

(senior vs non-senior)<sup>31</sup> as central attributes related to what they termed ‘student retention’. Odds ratios (*OR*) of 0.44 and 0.48 respectively, were obtained and indicated that for every decrease in cumulative GPA or decrease in class standing, there was a higher chance of withdrawal. Previous withdrawal from online courses was another factor significantly related to withdrawal rates (*OR* = 1.69), with a student 69% more likely to withdraw if he or she had done so before (Cochran et al., 2014). Also significant was a student’s gender, with males being 29% more likely to withdraw when compared to their female counterparts (*OR* = 1.29), and receipt of educational loans (*OR* = 1.94). Ethnicity was also significantly related to the outcome variable, with black students being 36% more likely to withdraw when compared to the other students (Cochran et al., 2014). Although attempting to measure retention, this study examined withdrawal from a course (Cochran et al., 2014), somewhat consonant with the concept of attrition rather than retention.

### **3.2.2 Transactional presence**

Shin (2003) explored the perceptions of psychological presence that ODL students have with their teachers, peer students, and their institutions. This perception of presence, defined as the degree to which a distance education student senses the availability of, and connectedness with, each party, is what Shin (2003) termed *transactional presence*.

Shin (2003) goes on to suggest that the degree to which an ODL student perceives transactional presence has a demonstrable influence on student retention in ODL contexts. In this regard, Shin’s (2003) analysis of student survey data indicated that a student's sense of institutional transactional presence significantly predicted student persistence in distance

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<sup>31</sup> Non-seniors comprised freshman, sophomore and junior students (see Cochran et al., 2014).

learning. By extension, Shin's (2003) research revealed that increases in student retention rates could also be attributed to identifiable support interventions, where the focus rests on enhancing institution transactional presence among students.

### **3.2.3 Locus of Control (LOC)**

From an international perspective, the findings as they pertain to an individual's locus of control (LOC)<sup>32</sup> appear to be consistent. Utilising discriminant analysis, Parker (1999) revealed that an internal LOC and the source of financial assistance were able to predict non-completion among distance education students with 85% accuracy. Replicating the work of Parker (1999), Morris et al. (2005) predicted student retention in distance education with a classification accuracy of 74.5% using the same two variables (i.e. LOC and financial aid). Similar results have been reported by Joo et al. (2011) and Lee and Choi (2013),  $\beta = 0.33$ ,  $t = 2.50$ ,  $p = .012$ ; and  $\beta = 0.47$ ,  $t = 2.89$ ,  $p = .004$ , respectively.

Although the construct has been measured among UNISA students (Liebenberg & Van Zyl, 2012), the findings appear to be limited to descriptive statistics. The results obtained from the 2012 pilot student profile survey indicated that students' measured levels of LOC varied, with the most substantial proportion of students having a combination of an internal and external LOC (Liebenberg & Van Zyl, 2012). Despite further exploration, which revealed that students who exhibited an internal LOC performed better during exams when compared to their external LOC peers, no significance testing is reported (Liebenberg & Van Zyl, 2012). As a result, it remains unknown whether these results were obtained by chance or if

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<sup>32</sup> Locus of control (LOC) refers to an individual's beliefs and perceptions about the extent of control that they have over the conditions of their lives (Rotter, 1966).

an internal LOC significantly influences success and retention among UNISA students. Similarly, the absence of the construct in subsequent versions of the student profile survey remains contentious.

### **3.2.4 Self-efficacy and attribution**

The findings as they pertain to self-efficacy<sup>33</sup> and attribution<sup>34</sup> are mixed. DeTure (2004) revealed that self-efficacy, as it relates to the use of online technologies, was a poor predictor of student success in ODL environments,  $F(5,67) = 0.50$ ; *ns*. Wang et al. (2008), on the other hand, revealed that self-efficacy and an internal attribution style were related to student success in ODL settings, but indirectly ( $r = 0.48$  and  $r = 0.21$ , respectively). A structural equational model (SEM) revealed that learning motivation and learning strategies mediated these relationships (Wang et al., 2008).

### **3.2.5 Motivation**

There are many who maintain that motivation is the predominant non-cognitive factor affecting student retention (Anderson, 2006; Boyd, 2004; Dille & Mezack, 1991; Du Plessis, et al., 2005; Fjortoft, 1995; Müller et al., 2007; Simpson, 2013; Wang et al., 2008). Within UNISA's context, Müller et al. (2007, p. 29) revealed "that motivation is the most important lead in the success profile chain". Results from their classification tree analysis, Chi-square Automatic Interaction Detector (CHAID), alluded to the significance of this

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<sup>33</sup> An individual's subjective perception of his or her capability to perform in a given setting or to attain desired results (Bandura, 1977).

<sup>34</sup> An inference regarding the cause of a person's behaviour or an interpersonal event (Heider, 1958).

predictor. Further results indicated that motivation, age, time management, and repeat status were able to predict student outcomes with over 70% accuracy. However, it should be noted that motivation was not directly measured; instead, it represented the degree category for which the student was registered (Müller et al. 2007, p. 29)<sup>35</sup>.

Elsewhere, Fjortoft (1995) was able to explain 23% of the variance in persistence rates among distance education students using intrinsic motivation, age, and level of ease with individual learning,  $F(8,151) = 5.670, p < .01$ ). Univariate tests revealed that intrinsic motivation was the strongest and most influential variable in the model (Fjortoft, 1995). Similarly, Wang et al. (2008) revealed that learning motivation had a positive predictive effect on student success among ODL students, with SEM results revealing a direct effect size of  $r = .76$ . Using the same modelling technique, González (2015) identified both intrinsic and extrinsic motivation as significant indicators of retention among distance education students, revealing direct effect sizes of  $r = .43$  and  $r = .33$ , respectively. Dille and Mezack (1991), by slight contrast, noted that distance education students who were successful and/or had been retained exhibited internal motivation, whereas unsuccessful students tended to demonstrate external motivation.

Despite the “near-universal belief amongst educators in the efficacy of motivation in distance learning” (Simpson, 2008, p. 160), researchers have speculated that the relationship

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35 “Motivation was taken to be reflected in the degree the student had registered for. Degree was categorised according to B Compt, B Com and other degrees for which first year Accounting was a prerequisite. It was argued that a B Compt student would be more motivated as he or she aspires to a future professional career as a chartered accountant (CA), as opposed to students taking B Com and other degrees, where students have no choice but to take first year Accounting and may therefore be less motivated to achieve success.” (Müller et al., 2007, p. 25).

between motivation and student outcomes (such as success and retention) is mediated by another non-cognitive trait (Duckworth et al., 2007; Reraki et al., 2015; Von Culin et al., 2014). Seeking to confirm these speculations using a Sobel  $z$ -test<sup>36</sup>, Reraki et al. (2015) revealed that the relationship between motivation and student outcomes *is* significantly mediated by another non-cognitive, namely psychological grit ( $z = 8.97$ ;  $p < .01$ ) – a personality trait associated with the completion of challenging long-term goals (Duckworth et al., 2007).

### 3.3 Summary

A plethora of research is currently available on the predictors of student success *and* retention in an HE setting, ranging from prior academic performance (be it in high school or on a university entrance exam), to non-cognitive attributes and psychosocial constructs (such as motivation, self-efficacy, self-confidence and self-control). However, as seen, there have been only a handful of studies predicting students' chances of *retention* in ODL, with even less emanating from South Africa's ODL landscape. Although both cognitive and non-cognitive attributes have been explored at UNISA, albeit briefly, psychological grit remains virtually untouched, and its value unknown. It is against this backdrop that the current research aims to explore psychological grit and its predictive effect on student retention among postgraduates at UNISA.

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<sup>36</sup> This test verifies whether a mediator carries the influence of the interdependent variable to the dependent variable (Sobel, 1982). The Sobel  $z$ -test is characterised as being restrictive; as such, it assures that the verified results are not derived from collinearity issues (Sobel, 1982).

## **CHAPTER 4: THEORETICAL FRAMEWORK**

In this fourth chapter, the reader is guided through a chronological overview of the past and current theories of student success and retention, followed by the quandaries associated with such models. Thereafter, the theoretical framework that underpins the current study, namely psychological grit (Duckworth et al., 2007), is reviewed in terms of its cornerstones and critiques.

### **4.1 An overview of the prominent theories in student retention**

Theories and models of student throughput and retention have been prominent in discourse for over four decades. First and foremost among them is the theory proposed by Spady (1970), which became the first widely recognised throughput model for tertiary education (Demetriou & Schmitz-Sciborski, 2011). Shortly after, Tinto (1975) developed his seminal integration model, which is ubiquitously cited in student retention literature. These and others are discussed in the subsequent sections.

#### **4.1.1 Spady's model (1970)**

In 1970, Spady alluded to the fact that the research available on student throughput at the time lacked a robust theoretical basis (Spady, 1970). In an attempt to narrow this gap, Spady (1970) proposed a sociological model of attrition, founded in part on Durkheim's (1951) suicide model. Spady (1970) selectively borrowed Durkheim's notion that shared group values (i.e. normative congruence) and support from friends reduce suicide and, by his analogy, dropout (Bean, 1981).

Spady's (1970) model posited that these two variables (normative congruence and support from friends), together with academic potential, grade performance, intellectual development, and two intervening variables (i.e. satisfaction and commitment), contribute to a student's social integration and are linked to the decision to drop out (Spady, 1970). Notwithstanding the contribution of the other variables, a year after the model had been developed, results revealed that academic performance was the most influential indicator in the model and explained more variance in attrition than any other independent variable (Spady, 1971).

#### **4.1.2 Moore's model (1973)**

In an attempt to predict student outcomes, Moore (1973) explored the cognitive space between lecturers and students in a distance education setting, what he termed *transactional distance*. Three variables are of particular importance to this theory (Moore, 1997), namely structure (of programmes), dialog (or interaction between students and lecturers), and autonomy (or the nature and extent of self-directedness of the student). The extent of transactional distance is a function of these three sets of variables (Moore, 1997, p. 22).

Moore's (1973) theory suggests that the separation between lecturer and student, inherent in distance education, is what profoundly affects both teaching and learning. Within the confines of this separation there is a psychological and communications space to be crossed (i.e. the transactional distance), a space of potential misunderstanding between the student and lecturer, a space which should be ameliorated by pedagogical design (Moore, 1997).

While notably one of the most prominent theories in ODL, the utility of this theory rests on providing guidance to instructional designers on the process of *designing* course materials,

so as to minimise transactional distances and maximise the chances of successful learning outcomes. As such, and due to its pedagogical basis, it adds little value to understanding retention in the current research study.

#### **4.1.3 Tinto's model (1975)**

Building on the work of Spady, and by extension Durkheim, Tinto (1975) developed a model of attrition using academic integration (group values) and social integration (friendship support) as indicators. These became core to Tinto's student integration model (SIM). The SIM essentially asserts that students who integrate socially and academically into their university surroundings increase their commitment to the institution and are therefore more likely to persist (Tinto, 1975). In addition, Tinto's (1975) model claims that the degree of success a student experiences in HE influences the level of commitment a student has to his/her academic goals and the institution.

Tinto's (1975) model has evolved over the past few decades to include motivational variables, such as goal commitment, and encompasses diverse student profiles, such as African-American students, students from lower socio-economic backgrounds, and adult and transfer students with unique needs requiring detailed interventions (Tinto, 1993). Further iterations of Tinto's (1975) model described reaching an equilibrium between the students' expectations and the institutional mission, and ameliorating the transition of students moving through the higher education sector (Swail, 2004).

Tinto's contribution to understanding student retention has significantly influenced how researchers and practitioners view student success and retention among tertiary students (Swail, 2004). It is ubiquitously cited as the lens to viewing and understanding these

concerns facing HE (Cabrera et al., 1993; DeShields Jr, Kara, & Kaynak, 2005; Fike & Fike, 2008; Kim, 2015; Koen, 2007; Robbins et al., 2009; Roos, 2012; Tinto, 1975, 2007; Tinto & Pusser, 2006; Van Zyl, 2010). However, the current study will not be predicated on Tinto's (1975) model, due to its limited applicability among non-traditional students, older students, and those pursuing tertiary education at a distance (Cochran et al., 2014). It can be said that the experiences and integration processes for these students are dissimilar to contact-based students who live and are fully integrated into a campus (Cochran et al., 2014).

#### **4.1.4 Bean's model (1981)**

Shortly after the development of the SIM by Tinto (1975), Bean (1981) formulated a model of student attrition which stressed the importance of background and attitudinal characteristics (in addition to organisational and environmental variables) in determining student departure from HE (Bean, 1981; Demetriou & Schmitz-Sciborski, 2011). This model was one of the first to use numerous attitudinal variables to predict the intention to depart HE.

The attitudinal variables include assessments of the practical value of one's education, the institution's quality, and one's own self-development, the satisfaction and boredom one feels at school, confidence in being a successful student, adjustment to the institution, certainty of choice in attending the institution, loyalty (the importance of graduating from this institution as opposed to some other), major and occupational certainty, and educational goals (Bean, 1981, p. 20).

Bean (1981) asserts that all of the attitudinal variables presented in the model have a direct or indirect effect on students' intention to withdraw, which, as Bean (1981) states, is the immediate precursor to attrition. Bean (1981) has been able to attribute approximately 50% of the variance in attrition using the factors found in his model. Bean (1981) goes on to suggest that the large portion of variance explained is due, in part, to the inclusion of attitudinal variables, and the inclusion of a student's intention to leave.

While considerable (non-cognitive) strides are evident in this model, the outcome variable remains confined to attrition (i.e. dropout) and not retention (or persistence), as is the current focus. Moreover, with the distance nature inherent in the current study, a contact-based theory is of minimal use.

#### **4.1.5 Astin's model (1984)**

In 1984, a model of student involvement was developed by Astin (1984). Astin (1984, p. 518) refers to student involvement as "the amount of physical and psychological energy a student devotes to his/her academic experience". These include immersing oneself in the academic programme, participating in extracurricular activities, and interacting with lecturers and other institutional staff (Astin, 1984, p. 528). The theory postulates that three elements influence a student's sustained involvement in higher education (Pascarella & Terenzini, 2005, as cited in Demetriou & Schmitz-Sciborski, 2011):

1. Student demographics and prior experiences;
2. Their environment, including the experiences a student encounters during HE; and
3. Student characteristics, including knowledge, attitudes and beliefs post-college.

Succinctly stated, Astin's (1984) theory posits that the more involved a student is (in their academic activities, participation in extracurricular activities, etc.), the more likely they are to persist and graduate.

In light of the involvement in the extracurricular activity, Astin's (1984) theory of student involvement has limited applicability for the non-traditional student – a student who is often older, a commuter student and attends university or college on a part-time basis (frequently due to work and/or family responsibilities). In this regard, Bean and Metzner (1985) put forth a model to explain the retention of non-traditional students. This model is discussed next.

#### **4.1.6 Bean and Metzner's model (1985)**

Bean and Metzner (1985) indicate that a defining characteristic of the non-traditional student is the lack of social integration into the institution, and so a different theory is needed. Bean and Metzner (1985) identified four factors believed to have an impact on the retention of such students: 1) academic variables such as course availability, study habits, and absenteeism; 2) student background variables such as age, ethnicity, gender, and prior GPA; 3) environmental variables such as finances, work and family responsibilities; and 4) academic and psychological outcomes while at college (Bean & Metzner, 1985). Bean and Metzner's (1985) model stipulates that:

Non-traditional students with poor academic performance are expected to drop out at higher rates than students who perform well, and GPA is expected to be based primarily on past (high school) academic performance. The second major factor is intent to leave, which is expected to be influenced primarily by the psychological outcomes but also by the academic variables.

The third group of variables expected to affect attrition are the background and defining variables - primarily high school performance and educational goals. These effects, however, may be mediated by other endogenous variables in the model. Finally, the environmental variables are expected to have substantial direct effects on dropout decisions (Bean & Metzner, 1985, p. 490).

Granted this model is valuable, mainly due to its focus on non-traditional students (such as those enrolled at UNISA), the non-cognitive attributes included in the model such as encouragement, utility, satisfaction, and stress are not relevant to the current study. Although goal commitment is included in Bean and Metzner's (1985) model, the construct does not tap into the passion (or consistency of interest) and perseverance for long-term goals – two focal concepts in the current study.

#### **4.1.7 Kember's model (1995)**

Kember (1995) also developed a model for non-traditional students, adapting Tinto's (1975) SIM to suit distance education learners. Adhering to the recommendation stipulated by Tinto (1975) that modifications are necessary if one wishes to apply the model to non-traditional settings, Kember (1995) reshaped academic and social integration to accommodate the distance education student. Kember (1995) redefined academic integration to encompass all facets of the non-traditional setting. This included the study package and mediated lessons, tutoring by faculty members and any interaction between student and institution, whether of an academic or administrative nature. Social integration, on the other hand, was repackaged to refer to the degree to which a student is able to integrate the demands of studying, while meeting the demands of work, family and personal life (Kember, 1995).

According to Kember's (1995) model, students move through one of two distinct learning paths, social integration to academic integration, or external attribution to academic incompatibility (Lee & Choi, 2011). Kember's (1995) model claims that students who struggle to integrate study demands with social obligations tend to attribute their integration failure(s) to external factors that are essentially beyond their control. These include insufficient time, unexpected events, and distractions (Kember, 1995).

Although Kember's (1995) model provides a useful framework for understanding persistence in distance education (Lee & Choi, 2011), the social and academic integration elements embedded in the model are of little use in the current study. Moreover, Kember's (1995) model lacks the psychological attributes and processes which are said to underpin the decision to persist in HE. In this regard, Bean and Eaton's (2000) model has made considerable contributions. This model is discussed next.

#### **4.1.8 Bean and Eaton's model (2000, 2001)**

Bean and Eaton (2000, 2001) adapted Tinto's (1975) model to include psychological characteristics and processes to explain the decision to depart or persist (Van Zyl, 2010). The central premise of Bean and Eaton's (2001) theory is that psychological attributes, such as self-efficacy, coping strategies, locus of control and past behaviour, play an important role in both academic and social integration, and subsequent student persistence. At its basis, Bean and Eaton's (2001) theory states that when a student believes in his or her ability to achieve his or her goals, he/she will persist on tasks and develop higher goals. The theory further suggests that as self-efficacy increases, academic and social integration into higher

education will also increase, leading to subsequent student retention (Demetriou & Schmitz-Sciborski, 2011, p. 9).

However, Bean and Eaton (2000) caution that their model is not optimal for use among students who lack the abilities or skills required for university (i.e. those who are academically under-prepared) – a key attribute among a large portion of UNISA students (Phewa, 2013; Tladi, 2014; Van Schoor, 2010). For this reason, Bean and Eaton's (2001) model is not utilised as the basis for understanding retention among the current sample.

#### **4.1.9 Rovai's model (2003)**

More recently, Rovai (2003) developed the composite persistence model which viewed persistence in HE as an ongoing decision made by the student, influenced by personal characteristics and skills, together with factors within and external to the study experience. Rovai (2003) suggests that an investigation into student characteristics and competencies before enrolment allows institutions to identify students who are likely to benefit most from support services or those who may require monitoring (Rovai, 2003, as cited in Nichols, 2010). While useful, primarily due to the inclusion of personal characteristics and the focus on persistence, Rovai's (2003) model illustrates that optimal student and institutional characteristics are no guarantee of retention, mainly due to the plethora of external factors which impact on students' studies (Nichols, 2010). Moreover, due to the inclusion of external factors, which are not hypothesised to predict retention in the current study, Rovai's (2003) model was not adopted.

#### **4.1.10 UNISA's model (2011)**

Akin to the models described above, UNISA's socio-critical model views student retention as a complex, layered and dynamic web of events (Subotzky & Prinsloo, 2011; Swanepoel et al., 2011; Tinto, 2007). UNISA's socio-critical model (Subotzky & Prinsloo, 2011) suggests, as did Rovai's (2003), that internal and external factors, together with cognitive and non-cognitive aspects, impact strongly on student retention, and subsequently success.

The socio-critical model for improving student success and retention among ODL students highlights the need to reshape student support services, formative assessments, and admission requirements in line with UNISA's socio-economic and educational climate (De Swardt & Marx, 2013). Within this model, the fundamental constructs are capital, habitus, attribution, locus of control, and self-efficacy; and are applied to both students and institutions in understanding success and retention (see Figure 5). Subotzky and Prinsloo (2011) describe the interaction between these constructs as follows:

As the student walk progresses, the dynamic interrelationships between the agency, capital, and habitus unfold in the transformation process, in the various domains and modalities. The result of these multiple, mutually constitutive interactions is the extent of fit between student and institutional attributes, which, when sufficient, culminates in broadly defined success (Subotzky & Prinsloo, 2011, p. 188).

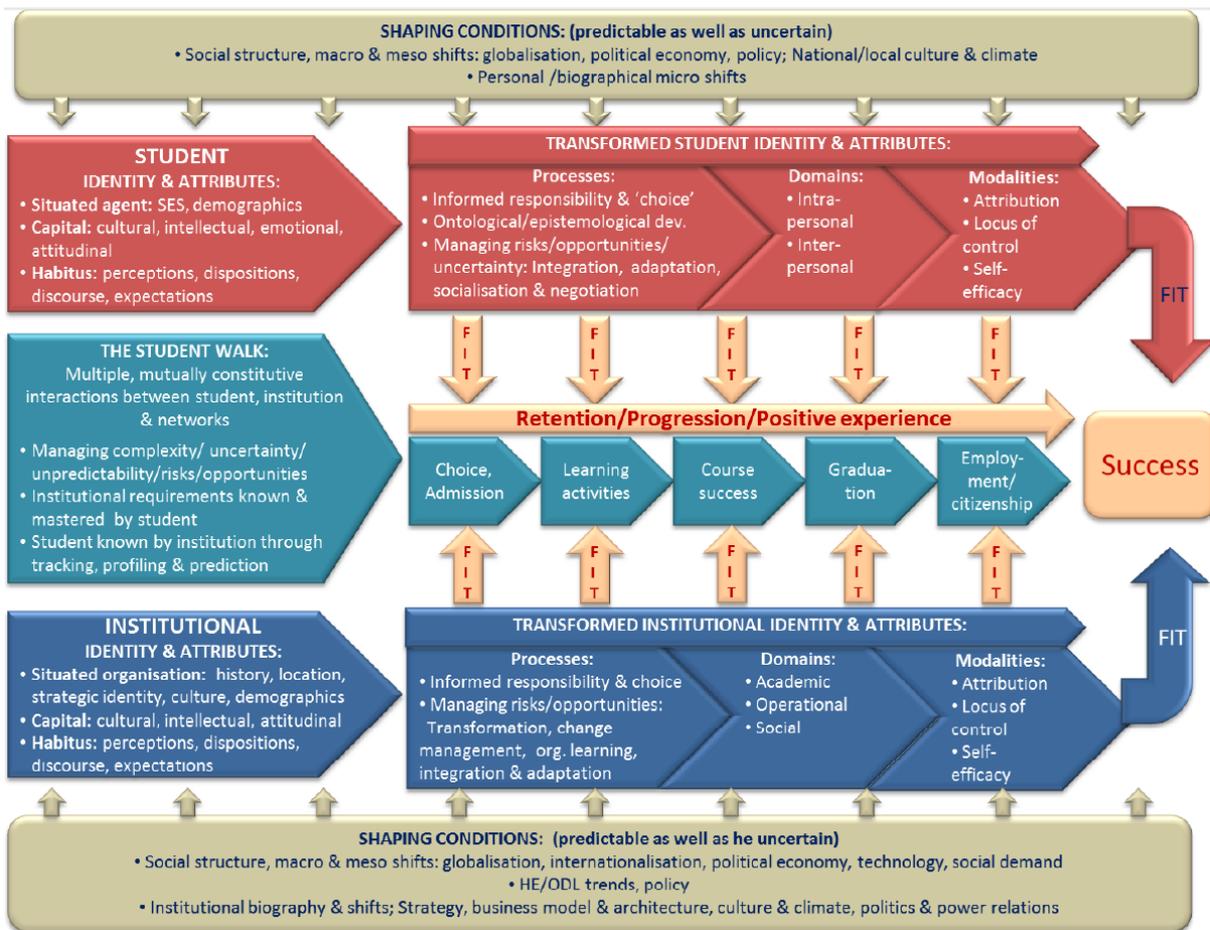


Figure 5: Socio-critical model for explaining, predicting, and enhancing student success

Source: Prinsloo, 2009, p. 115

The socio-critical model aims not only to understand student success and retention among ODL students in South Africa, but also to change and influence current praxis (Prinsloo, 2009). On this matter, the socio-critical model asserts that change must occur within the student's intra-personal domain, strengthening the chances of retention and enhancing student success (Subotzky & Prinsloo, 2011). This domain addresses the range of psychological attributes which have been reported to enhance student success and retention, and includes self-discipline, motivation, confidence and a positive attitude (Subotzky & Prinsloo, 2011). In addition to these non-cognitive attributes, the intra-personal domain

“emphasises the liminal spaces where the self-efficacy of students, their attribution of their success or failures as well as their locus of control, meet” (Prinsloo, 2009, p. 94).

The currently implemented student success framework, developed by Subotzky and Prinsloo (2011), relies on a suite of instruments, as well as systems data to inform policy and practice (Archer et al., 2014; Subotzky & Prinsloo, 2011). However, as Archer et al. (2014) rightly indicate, little information is available on the habits and behaviours of UNISA students, and as Bean (1981), Bean and Eaton (2000), Prinsloo (2009), Szulecka, Springett and De Pauw (1987), and Tross et al. (2000) suggest, other non-cognitive attributes may be useful predictors when modelling university success and retention.

#### **4.2 Adopting a theoretical approach: Psychological grit**

For the past decade, Angela Lee Duckworth (2007-15) of the University of Pennsylvania has been working within the field of positive psychology, adding to her seminal works on psychological grit – described as a quality that enables individuals to work hard and stick to their long-term goals. Defined by Duckworth et al. (2007), psychological grit is a positive, non-cognitive trait centred on an individual’s passion for a particular long-term goal, combined with a powerful motivation to achieve that purpose. “Grit entails working strenuously toward challenges, maintaining effort and interest over the years despite failure, adversity, and plateaus in progress” (Duckworth et al., 2007, p. 1087). Succinctly defined as perseverance (of effort) and passion (consistency of interest) for long-term goals, Duckworth and colleagues posit that these variables are essential to success and retention no matter the domain (Duckworth et al., 2007).

Duckworth et al. (2007) pioneered the construct of grit and conducted the first studies on grit and its effect on academic performance among various groups of students. Results from one these studies found that grit was a significant predictor of academic success, with grittier individuals attaining higher levels of education when compared to less gritty individuals of the same age ( $OR = 1.23$ ) (Duckworth & Quinn, 2009). Another study described how undergraduate psychology students at the University of Pennsylvania who scored higher in grit earned higher GPAs ( $r = .25, p < .01$ ), despite having lower SAT scores (Duckworth et al., 2007). Grit also significantly predicted GPA in subsequent years of study, beyond that of intelligence (i.e. SAT score). Interestingly, grit was negatively correlated with SAT scores ( $r = -.20, p < .03$ ), suggesting that “smarter students may be slightly less gritty than their peers” (Duckworth et al., 2007, p. 1093).

In other studies, Duckworth et al. (2007) and Eskreis-Winkler et al. (2014) discovered that psychological grit significantly predicted retention among cadets in the military, surpassing self-control and all other predictors (Duckworth et al., 2007; Eskreis-Winkler et al., 2014). Two large samples (i.e. 2004 and 2006 cohort) of West Point cadets<sup>37</sup> participated in the study by Duckworth et al. (2007). Cadets in the class of 2008 ( $N=1,218$ ) completed the Grit–O upon entering West Point in 2004. Eighty-four percent of the sample was male, and the mean ( $\bar{x}$ ) age was 19.05 years ( $SD = 1.10$ )<sup>38</sup> (Duckworth et al., 2007; Eskreis-Winkler et al., 2014). Cadets in the class of 2010 ( $N = 1,308$ ) completed the Grit–O in 2006 and exhibited a similar demographic profile to the class of 2008 cadets (Duckworth et al., 2007; Eskreis-Winkler et al., 2014). In both cadet samples, dropout from West Point was assessed after the rigorous summer training session to evaluate each item’s predictive validity. Results

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<sup>37</sup> United States Military Academy (also known as West Point)

<sup>38</sup> Sigma denoting the standard deviation ( $\sigma$ )

revealed that among West Point military cadets entering their first summer of training (a transition from civilian to military life known as Beast Barracks), grittier cadets were more likely to persist ( $OR = 1.62$ ) (Duckworth et al., 2007). In contrast, an index of talent called the Whole Candidate Score in West Point, which integrates SAT scores, class rank (determined by HSGPA), demonstrated leadership ability, and physical aptitude, did not significantly predict retention (Duckworth et al., 2007).

Within a similar context, Eskreis-Winkler et al. (2014) used a sample of 677 male Army Special Operations Forces (ARSOF) cadets to explore the predictive validity of grit in determining retention. Results from a binary logistic regression revealed that grit ( $OR = 1.28$ ), general intelligence ( $OR = 1.60$ ), years of schooling ( $OR = 1.53$ ), and physical fitness ( $OR = 1.79$ ) predicted retention. When controlling for general intelligence, physical fitness, age and years of schooling, the effect of grit remained significant ( $OR = 1.32$ ). Keeping the other variables constant, candidates who scored one unit higher in grit were 1.32 times more likely to be retained after completing the ARSOF selection, when compared to their less gritty candidates (Eskreis-Winkler et al., 2014).

Around the same time, using multivariate statistics and hierarchical regression techniques, Strayhorn (2013) showed that grit significantly predicted college grades for black male students and that grit added incremental predictive validity over and beyond traditional measures of academic success<sup>39</sup>. Background characteristics (age, fraternity membership, athlete, international student, transferring student, years in college), academic factors (HSGPA, ACT scores, and college GPA), and grit explained roughly 24% of the variance in

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<sup>39</sup> HSGPA and ACT scores

black males' college grades. Results from the study by Strayhorn (2013) represent a significant extension of grit research, as previous grit studies have been based almost exclusively on predominantly white, female adult or adolescent samples, or military cadets (Strayhorn, 2013). Regardless of ethnicity, gender, or setting, consistent results point to the fact that “grit positively predicts achievement in challenging domains over and beyond mere talent or cognitive ability” (Duckworth & Quinn, 2009; Strayhorn, 2013, p. 7).

However, it remains unclear which domain(s) were responsible for the significant retention predictions in the studies above, or if it was the interaction between the two domains (consistency of interest and perseverance of effort). In this regard, Duckworth et al. (2007), Eskreis-Winkler et al. (2014), and Strayhorn (2013) did not examine the subscales of grit individually, but instead relied on the composite score. Chang (2014) bridged this gap and revealed that the composite score of the Grit-S scale is *not* a significant predictor of success among first-year students at a highly selective, private institution. Rather, Chang (2014) revealed that the *perseverance* subscale of grit (as opposed to the *passion* domain) was significant in predicting academic performance (used as a proxy for retention in the study by Chang, 2014). However, the gap has only been bridged for students from one private, contact-based institution in the United States, thus limiting the generalisability to the South African ODL context.

Recent research findings revealed by Rimfeld et al. (2016), concur with those of Chang (2014), indicating that the *perseverance* subscale does better at predicting challenging outcomes when compared to its counterpart (i.e. *passion*). While personality factors (primarily conscientiousness) predicted academic performance, grit (in its entirety) was shown to add little to this prediction (increasing the explained variance by only 0.5%) with

roughly two-thirds of the General Certificate of Secondary Education (GCSE) prediction mediated by genetics. Nevertheless, conscientiousness and the perseverance component correlated most highly with the GCSE scores ( $r = 0.24$  and  $0.17$  respectively), whereas the passion component had a weak correlation coefficient of  $0.06$  (when interpreted against the GCSE score) and did not significantly predict performance. Together, the two Grit-S subscales explained  $2.0\%$  of the variance in GCSE grades (Rimfeld et al., 2016). Comparable to the results by Chang (2014), Rimfeld et al. (2016) indicated that the perseverance subscale significantly predicted results on the GCSE independent of the other subscale (i.e. consistency of interest) but not vice versa (Rimfeld et al., 2016, p. 5).

The study by Rimfeld et al. (2016) is limited to adolescents in secondary school, and while there is an appreciation for the research, reported research suggests that grit plays a more significant role in tertiary education (Akos & Kretchmar, 2017; Beyhan, 2016; Duckworth et al., 2007; Duckworth & Quinn, 2009; Mason, 2018; Pate, Payakachat, & Harrell, 2017; Reraki et al., 2015). This is due in part to the research findings which suggest that grit increases monotonically with age and becomes increasingly important when individuals understand what their aspirations and long-term goals are (Eskreis-Winkler et al., 2014).

Moreover, while applied to traditional tertiary settings, to date no research findings exist on the relationship between psychological grit and the *retention* of ODL students at UNISA. Although research of a similar nature has been conducted among distance education students (Cross, 2014; Hwang et al., 2017; Neroni et al., 2015; Wang & Baker, 2018), these studies sought to identify the determinants of *success* (i.e. performance) and not the determinants of

*retention*<sup>40</sup>. And while South African research has explored grit among tertiary students (Mason, 2018; Urban & Richard, 2015), these findings remain restricted to those attending contact-based institutions.

### **4.3 Critique of psychological grit**

The trenchant critiques of psychological grit emerged in a meta-study conducted by Credé et al. (2016) that examined a total of 584 effect sizes from 73 studies representing data from 88 independent samples and 66,807 individuals. Results from the meta-analytical review revealed four underlying critiques (Credé et al., 2016, p. 2):

1. The higher-order structure of grit is not confirmed;
2. Grit is only moderately correlated with success and retention;
3. Odds ratios are misrepresented in seminal studies, and
4. Grit is strongly correlated with a Big-Five<sup>41</sup> facet, conscientiousness

According to Kline (2011), introducing a model with one second-order factor and two first-order factors does not necessarily classify it at the higher-order level. In this regard, Credé et al. (2016) revealed that Duckworth and Quinn (2009) did not impose the correct constraints on the loadings of the two first-order factors onto the higher-order factor, a

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<sup>40</sup> As mentioned in Chapter 1, student retention should not be confused with student completion or success (Mouton et al., 2015). Although the concepts of student success and retention overlap and are inextricably linked, the former often relates to the performance of students whereas the latter focusses on persistence from one academic period to the next, regardless of performance.

<sup>41</sup> The Big-Five personality test is a five-factor model used to evaluate five core traits of an individual's personality (Goldberg, 1990). These traits include openness to experience, extraversion-introversion, agreeableness, neuroticism, and conscientiousness – the latter of which is discussed further in this chapter.

procedure that is necessary to attain higher-order level. Credé et al. (2016, p. 5) go on to say that, “even if an equality constraint had been imposed at the higher-order level, the resultant second-order model would have exhibited identical fit to a model with two correlated first-order factors and no second-order factor”. Moreover, the CFA, conducted by Duckworth et al. (2007) to test the fit of such a two-factor model, reported a relatively poor fit for the model (i.e. CFI = .83, RMSEA<sup>42</sup> = .11)<sup>43</sup>. This strategy (i.e. CFA) used by Duckworth et al. (2007) to determine whether a higher-order grit construct exists is therefore not useful due to its inability to differentiate between a higher-order model and a model with two correlated factors (Credé et al., 2016).

The second critique of grit, according to Credé et al. (2016), is that it exhibits only modest relationships with academic performance ( $\rho = .18$ ;  $N = 13,141$ ) and retention ( $\rho = .18$ ;  $N = 11,163$ ) that do not compare favourably with other well-known predictors, such as cognitive ability. In line with this, Credé and colleagues (2016) have suggested that three theoretically plausible moderators may affect the strength of these relationships: the nature of the performance domain, individual differences such as ability and meta-cognition, and the level of grit itself.

With regard to the first moderator, Credé et al. (2016) suggest that, while an indicator of an individual’s ability to endure military training or to succeed in academic tasks, grit is not strongly related to performance on tasks requiring no grit, (i.e. those that are easy, novel and/or ill-defined). As a result, students may be required to adopt both creativity and the willingness to abandon ineffective strategies to reach one’s long-term goals (i.e. tasks on

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<sup>42</sup> Root Mean Square Error of Approximation.

<sup>43</sup> Appropriate cut-offs are discussed in Chapter 6.

which grit may be counterproductive). The second moderator put forth by Credé et al. (2016), the individual differences in ability and meta-cognition, suggests that high levels of grit may not necessarily emerge unless paired with the general potential and ability to succeed. Lastly, Credé et al. (2016) indicated that the grit-performance relationship might be moderated by the level of grit itself; with high levels of grit becoming dysfunctional. This results in the reduction of help-seeking behaviours and the continued persistence to solve a problem that is particularly challenging, rather than persevering through more decipherable problems (Lucas, Gratch, Cheng, & Marsella, 2015, as cited in Credé et al., 2016).

Credé and colleagues (2016, p. 10) highlight a further critique, noting that the authors Duckworth and Quinn (2009) “appear to confuse odds ratios with probabilities, resulting in incorrect inferences about the size of observed effects”. In the study by Duckworth and Quinn (2009, p. 171), the identified odds ratio of 1.99 was interpreted to mean that students who scored one standard deviation higher than average on the Grit-S scale were 99% more likely to complete Beast Barracks when compared to their less gritty peers (described in Section 4.2). However, as Credé et al. (2016) point out, this interpretation is incorrect; results from the studies by Duckworth and colleagues revealed that, overall, 95% of all cadets made it through Beast Barracks, while 98% of the grittiest candidates made it through (Kamenetz, 2016). Credé et al. (2016, p. 10) go on to say that “this relatively small increase in the completion rate from 95% to 97.5% associated with a one-point increase in grit scores would represent an odds ratio of 2, amounting to a 2.6% increase in the likelihood of completing the programme”. As Credé et al. (2016) rightly indicate, this misunderstanding may have led many to infer a much higher predictive power of grit than is warranted (Credé et al. 2016).

Lastly, the conceptual overlap between conscientiousness and grit raises the possibility that the advocates of grit may have fallen victim to what Kelley (1927) refers to as the *jangle fallacy*, a belief that two things are different simply because they have different names. Credé and colleagues (2016) illustrate the similarity by drawing on items that measure conscientiousness found in the International Personality Item Pool (IPIP) (Goldberg, 1990) and those that measure perseverance in Duckworth et al.'s (2007) scale. Evidently, Duckworth et al.'s (2007) items, such as 'I finish whatever I begin' and 'I am a hard worker', are analogous to 'I carry out my plans' and 'I work hard' used by the IPIP (Credé et al., 2016).

Despite claims by Duckworth et al. (2007), Duckworth and Quinn (2009) and Perkins-Gough and Duckworth (2013) that grit is distinct from conscientiousness, the same authors (i.e. Duckworth et al., 2007; Duckworth & Quinn, 2009) report correlations between conscientiousness and grit scores that approach unity (i.e. 1.00) (Credé et al., 2016), an indication that the two constructs are measuring the same concept. Similarly, Meriac, Slifka and LaBat (2015), and Reed, Pritschet and Cutton (2012) reported that the relationship between grit and conscientiousness approaches unity when correcting the observed correlations for unreliability. Moreover, there is currently no evidence to suggest that the discriminant validity has been established between the perseverance domain in the Grit-S scale and the construct of conscientiousness (Credé et al., 2016).

Notwithstanding the strength and validity of the critiques put forth by Credé et al. (2016), they are not entirely specific to higher education. Of the 68 listed sources<sup>44</sup> in the

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<sup>44</sup> Only 68 of the 73 included sources were listed in the bibliography.

bibliography, more than one-third is unrelated to the current research, with article topics ranging from suicidal behaviour and non-suicidal self-injury to the beneficial aspects of endorsing masculine norms. The remainder of the sources, although closer aligned to the current context, did not include any South African tertiary studies, nor any relating to ODL students. As such, while the aforementioned critiques may be valid for cadets in the military, learners in primary or high school, or traditional tertiary students abroad, the generalisability of these critiques to the South African ODL context cannot be assumed.

#### **4.4 Summary**

Rather than viewing student retention as “complex and multi-layered” (Scott et al., 2007, p. iv) or as “a complex web of events” (Tinto, 2007, p. 1), the current study sought a “fruitful combination of simplicity and strength” (Lewis, 1973, p. 73). As such, the theory of grit proposed by Duckworth et al. (2007) was adopted. The implication of utilising psychological grit as both a central concept and the theoretical backbone enabled the researcher to view ODL retention as a product of pursuing a passionate interest with perseverance, despite failure and adversity, over the course of years to obtain a tertiary qualification at a distance.

## **CHAPTER 5: RESEARCH METHODOLOGY**

Chapter 5 commences by outlining the philosophical paradigm and the non-experimental design of the study, along with the limitations and benefits of the latter. The research aims and questions are then noted, followed by a description of the primary- and secondary data collection methods. The population and sampling procedures, together with the data analysis techniques, are then discussed. The chapter concludes with a concise summary of the ethical considerations pertaining to the study.

### **5.1 Research paradigm and design**

This study adopted a non-experimental design to identify correlations and facilitate predictions between grit and student retention. This design is located within the positivist paradigm which is predicated on the assumption that universal laws govern events, and that uncovering these laws enables researchers to describe and predict phenomena (Tuli, 2011). This approach places emphasis on scientific and objective methods, testing hypotheses, and measuring variables utilising quantitative, statistical techniques (Sarantakos, 2005).

Non-experimental designs are integral to research studies which either describe a group or examine relationships between pre-existing groups (Lobmeier, 2012; Salkind, 2010). In non-experimental research, participants are not randomly assigned to groups (in this case, to the retained and not retained groups), and the independent variable (i.e. grit) is not manipulated. Resultantly, no conclusions about causality can be drawn between psychological grit and student retention in the current context (Lobmeier, 2012; Salkind, 2010).

Within the broader non-experimental framework, a correlational design was deemed most appropriate for the current study. This was primarily due to the fact that the study sought to measure two or more non-manipulated variables for each student to ascertain whether linear relationships existed between the two constructs (Lobmeier, 2012). Using correlational statistics, these relationships were described and measured (Creswell, 2012). Where significant relationships were identified among the non-manipulated variables, logistic regression analyses were subsequently conducted to identify predictors (Cresswell, 2012).

### **5.1.1 Limitations of the research design**

While appropriate for the current study, the adopted research design is not without limitations. As indicated, no conclusions about causal relationships can be drawn from non-experimental, correlational research designs (Creswell, 2014; Lobmeier, 2012). This is primarily due to two reasons: participants are not randomly assigned to groups, and the independent variable is not manipulated in any way. In this regard, Lobmeier (2012, p. 2) indicates that “in experimental designs, members are randomly assigned to groups and the experimenter manipulates the values of the independent variable so that causal relationships might be established or denied. In quasi-experimental and non-experimental designs, the groups already exist”.

Another inherent limitation of non-experimental research designs is the threat of internal validity. This occurs when there is more than one possible explanation for the relationship between variables (Lobmeier, 2012). Lobmeier (2012) suggests that there are four threats to the internal validity, as it relates here, namely self-selection, assignment selection, history,

and maturation<sup>45</sup>. Considering that the researcher has little control over these threats and any potential confounding variables, the internal validity of the research design remains a limitation in the current study.

### **5.1.2 Benefits of the research design**

Notwithstanding the noted limitations of adopting a non-experimental correlational design, there are benefits to such an approach. While there is little control over the experimental process, Lobmeier (2012) suggests that one can improve the reliability of the findings by replicating the study. In addition, a non-experimental design is presumed to exhibit a stronger ecological or external validity when compared to controlled, experimental designs. “Given that non-experimental designs are often conducted with pre-existing interventions with *real people* in the *real world*, rather than participants in a laboratory, the findings are often more likely to be true to other real-world situations” (Lobmeier, 2012, p. 8).

## **5.2 Research aims**

The primary aim of the study was to determine whether psychological grit is a significant predictor of student retention among ODL students, particularly the 2017 honours cohort at UNISA. Prior to addressing the focal aim, the psychometric properties of the Grit-S scale had to be established among the sample with which it was used to ensure the derived scores were valid and reliable. Thus, the first objective assessed the validity and reliability of the scale for use within a South African ODL context, using Cronbach alpha values and an

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<sup>45</sup> See Creswell (2014) and Lobmeier (2012) for a detailed discussion of the threats to internal validity.

exploratory factor analysis (EFA), respectively (Field, 2009). The remainder of the research objectives were the following:

- To examine the relationship between grit and student retention within a South African ODL institution;
- To ascertain the predictive validity of grit in determining student retention within a South African ODL institution; and
- To assess whether grit adds incremental predictive value to the regression model when controlling for previous academic performance.

### **5.3 Research questions**

With the primary aim in mind, a focal research question was formulated: Do higher levels of psychological grit significantly predict the retention of honours students from first to second year at UNISA? This central research question, together with the sub-questions and hypotheses, are based on the existing literature by Chang (2014), Duckworth et al. (2007), Duckworth and Quinn (2009), Eskreis-Winkler et al. (2014), and Strayhorn (2013), all of whom utilised psychological grit as a basis for explaining and understanding either success or retention among students (of some nature). The sub-questions of the study are:

1. Is the Grit-S scale a valid and reliable instrument for use within a South African ODL context?
2. Is there a statistically significant relationship between grit and postgraduate student retention within a South African ODL institution?
3. Is grit a significant predictor of postgraduate student retention within a South African ODL institution?

4. And if so, does grit predict retention when controlling for previous academic performance?

The overarching one-tailed hypothesis of the study suggested that the higher the grit, the higher the likelihood of retention into the second year. The second hypothesis suggested that retention is better predicted by grit than measures of previous academic performance.

## **5.4 Collection of data**

The data was collected in a manner consistent with a non-experimental research design; the primary data (i.e. the demographic and Grit-S data; Table 4) was collected utilising a survey, and the secondary data was requested from UNISA's registration database (to ascertain retention status). A description of each of these collection procedures is outlined below.

### **5.4.1 Primary data collection**

An Excel spreadsheet containing the student numbers and e-mail addresses of the 2017 entering honours cohort was requested and received from UNISA's Registrar ( $N = 8,689$ ). Using LimeSurvey software and the embedded functionalities, a cover letter outlining the research, explaining the purpose and value of participation, was sent to students' myLife e-mail accounts<sup>46</sup> during July 2017. The e-mail allowed students the opportunity to participate or opt out. Should a student have indicated his or her wish to opt out, he/she was redirected to a custom ending point. Alternatively, students who consented were redirected to the start of the survey<sup>47</sup>. The online survey remained open for eight months, with a

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<sup>46</sup> University-provided student e-mail addresses.

<sup>47</sup> An internal pilot of the survey indicated that it took approximately seven (7) minutes to complete the survey.

reminder e-mail sent one week after its inception and another a month after its inception. After closing the survey at the end of March 2018, the data was downloaded and captured in an Excel spreadsheet.

**Table 4: Primary data – Independent variables**

<b>Attribute</b>	<b>Operationalisation</b>	<b>Variable type</b>
Workload	Number of modules	Continuous
Grouped matric aggregate	0-719, 720-949, 950-1199, 1200-1439, 1440-1679, 1680+	Ordinal
Aggregated UG* performance	0-25%, 26-49%, 50-74%, 75-100%	Ordinal
Gender	Female, Male, Other	Nominal
Age and grouped age	1-17, 18-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50+	Both continuous and ordinal
Ethnicity	African, Coloured, Indian, White, Unknown	Nominal
Home language	Afrikaans/English, isiXhosa, Sesotho, Afrikaans, isiZulu, Setswana, English, Italian, Shona, French, Khoi, SiSwati, German, Nama, Spanish, Greek, Ndonga, Tamil, Gujarati, Northern Sotho, Telegu, Hebrew, Other African Language, Tshivenda, Hindi, Other Foreign Language, Urdu, isiNdebele, Portuguese, Unknown, Xitsonga	Nominal
Employment status	Employed, Unemployed, Full-time student, Not classified, Unknown	Nominal
Disability	Applicable, Not applicable	Binominal
Grit score (5-point Likert-scale)	Not at all gritty, Slightly gritty, Moderately gritty, Very gritty, Extremely gritty	Both continuous and ordinal

\* UG = Undergraduate

#### **5.4.1.1 The Grit-S scale**

As indicated, the Grit-S scale (together with demographic items) was utilised to collect the primary data. The scale consists of two domains: passion (or consistency of interest) and perseverance (of effort), each compiled of four items. Responses are measured on a Likert-scale, with options ranging from '*not at all like me*' to '*very much like me*' (Duckworth & Quinn, 2009). In addition to the eight Likert-scale items, demographic variables were included to describe the sample. A brief history of the development of the grit scales is provided below.

#### **5.4.1.2 Development of the Grit-S scale**

Duckworth et al. (2007) proposed and developed the Grit-O scale to test the two-factor theory. The structure of the Grit-O scale was consistent with the theory of grit as a compound trait comprising stamina in interest and stamina in perseverance (Duckworth & Quinn, 2009). The Grit-O scale comprised 12 Likert-scale items measuring two constructs: consistency of interest and perseverance of effort. In addition to validating the scale, Duckworth and colleagues (2007) also found support that would suggest that grit provides incremental predictive validity for education settings (among others) above and beyond that explained by the Intelligent Quotient (IQ), to which it was *not* positively related (Duckworth et al., 2007).

Sometime later, the Grit-O scale was revised and subsequently replaced by the Grit-S scale (Duckworth et al., 2007), which still housed the two focal constructs embedded in eight Likert-scale questions, ranging from 1 (*not at all like me*) to 5 (*very much like me*). Sample items include: '*Setbacks don't discourage me*' or '*I finish whatever I begin*'. Responses to

each question have a corresponding point value, ranging from 1 to 5. The maximum score is 5 (extremely gritty), and the lowest is 1 (not at all gritty) (Duckworth & Quinn, 2009). Point values for each item can then be added together and divided by eight to compute a student's level of grit.

#### **5.4.1.3 Psychometric properties of the Grit-S scale**

Assessing the psychometric properties of the revised scale, Duckworth and Quinn (2009) revealed the sound reliability of the survey with Cronbach's alpha values ranging from .73 to .83 across four different samples. The Grit-S scale has also found to hold appropriate levels of validity with medium to strong predictive unstandardised regression coefficients ranging from 0.22 to 0.55. In addition, the scale has shown to predict student performance and retention with associated odds ratios ranging from 0.80 to 1.73. A reasonable model fit from a second order Confirmatory Factor Analysis (CFA), and a root mean square error of approximation (RMSEA) index ranging from 0.06 to 0.10 has also been reported (Duckworth & Quinn, 2009).

Notwithstanding the findings, which suggest the Grit-S scale is relatively stable over time and that grit can reliably be assessed by participants (Duckworth & Quinn, 2009), the samples used for psychometric analyses included traditional tertiary students, cadets in the military, or school learners between the ages of 11 and 17 years old. Accordingly, the generalisability to the distance education student cannot be assumed. Furthermore, there is currently no evidence to suggest that the psychometric properties of the Grit-S scale have been established within a South African *ODL context*, justifying further inspection.

#### 5.4.2 Secondary data collection

After the 2018 UNISA registration period had closed, and the registrations had been finalised, the secondary data (i.e. the retention data) was collected by requesting the sample's registration information ( $n = 837$ ) from the University's Registrar<sup>48</sup>. Student numbers were paired with the respective primary data (grit scores) in the Excel spreadsheet and assigned a retention status (i.e. 1 = retained, 0 = not retained). Students who were absent from the Excel file had not re-registered for their degrees, and were therefore classified as 'not retained'. Students whose registration information indicated they had cancelled their studies, or had payment(s) and/or form(s) outstanding, were also classified as 'not retained'. Those with finalised registrations (all forms and payments received) were classified as 'retained'.

Completed/graduating students in the sample were not anticipated. This was primarily due to two reasons; firstly, the 2017 *entering* cohort was selected as the population of interest (i.e. these students entered into the degree for the first time in 2017), and secondly, the minimum expected time to completion of this degree is 1.7 years (see Table 3). For these reasons, it seemed unlikely that the sample would contain students who completed this degree in one year.

#### 5.5 Population

The target population to which the researcher aimed to generalise included the 2017 *entering* honours students at the institution ( $N = 8,689$ ). As mentioned in Chapter 1, the demographic profile of this particular cohort (and other honours cohorts) is not elaborated on in any of

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<sup>48</sup> The ethical clearance permitted the request of secondary data only for those who participated in the survey. Requesting the retention status for the rest of the population was not permitted.

UNISA's reports. As such, presumptions are made on the basis of the broader student population comprising approximately 330,000 students (Tloubatla et al., 2016; University of South Africa, 2016a). This diverse student population is predominantly female, mostly African, and between the ages of 25 and 39 years. Accordingly, it was presumed that the target population for the current study (i.e. the 2017 entering honours cohort) mimic this demographic profile.

## **5.6 Sample**

Adopting a stratified random sampling strategy, the researcher aimed to survey at least 368 *entering* honours students to ensure sufficient data was collected to conduct the necessary analyses<sup>49</sup>. Moreover, achieving this sample size would allow for generalisability to the broader target population described above, as long as it is representative (Martínez-Mesa et al., 2014).

### **5.6.1 Response rate**

Of the 8,689 potential participants in the target population, over 1,000 students ( $n = 1,009$ ) started the survey. Partial responses<sup>50</sup> were received from 158 participants, while 851 participants submitted full responses. However, full responses also included those who chose to opt out. A total of 14 students opted out. This resulted in a final data set of full responses comprising 837 honours students, and a final response rate of 9.63%.

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<sup>49</sup> Using a 5% margin of error (i.e. Confidence Interval), 95% Confidence Level, 50% Response distribution, and a target population size of 8,689. See <http://www.raosoft.com/samplesize.html>.

<sup>50</sup> These participants started the survey but did not finish. This resulted in missing (grit) data. For this reason, the partial responses were removed from further analyses.

## 5.7 Data analysis strategies

Prior to conducting any analyses, the primary data (i.e. the survey data) was downloaded in a Microsoft Excel format (.csv file) and inspected for potential anomalies. Missing values were not present as all items required a response. Self-reported student numbers were then validated against the original file received from the institution's Registrar. Once verified, the primary (survey) data was merged with the secondary data (i.e. the retention status) using unique student numbers as the key/identifier. Thereafter the data was read into IBM SPSS<sup>51</sup> (Version 24). Data analysis commenced with an exploratory factor analysis (EFA), a partial confirmatory factor analysis (PCFA), and subsequent item analysis followed by descriptive and inferential analyses.

### 5.7.1 Factor analysis<sup>52</sup>

Before assessing the results of the Grit-S scale, the validity and reliability of the instrument were established. Firstly, the factorability of the eight Likert-scale items in the Grit-S scale was examined using two well-recognised criteria (Field, 2009): the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, and Bartlett's test of sphericity. Thereafter, an EFA with an oblique rotation (oblimin)<sup>53</sup> was conducted to identify the dimensions or constructs within the data (Field, 2009). Although there is substantial evidence for the factor structure of the Grit-S scale therein suggesting a CFA, to date there are no psychometric reports available on the scale within a South African ODL context. In this regard, it was deemed

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<sup>51</sup> Hereafter referred to as SPSS.

<sup>52</sup> Factor analysis is a multivariate technique for identifying whether the correlations between a set of observed variables stem from their relationship to one or more latent variables in the data, each of which takes the form of a linear model (Field, 2009, p. 786).

<sup>53</sup> An oblique rotation, as opposed to an orthogonal rotation, was adopted as it allows factors to correlate (Osborne, 2015).

necessary to first uncover the dimensions present in the questionnaire among a South African ODL sample. To this extent, an exploratory factor analysis was justified.

Using the Kaiser rule of omitting any factors with eigenvalues under one (Kaiser, 1960), factors were identified and either retained or discarded. Additionally, the scree plot was examined for inflexions that would justify the retention of the identified factors (Field, 2009). Thereafter, the pattern matrix was analysed to identify the items belonging to each factor (Field, 2009). These results were supplemented with a partial confirmatory factor analysis (PCFA). Once the factor structure had been both explored and partially confirmed, the researcher conducted item analyses on the domains to assess their reliability.

### **5.7.2 Reliability analysis<sup>54</sup>**

To test the reliability or internal consistency of the Grit-S scale, an item analysis was performed on the items within the identified factors and Cronbach's alpha values assessed. All variables within the identified factors were retained unless the removal of the item suggested an increase in the domain's overall reliability (increased Cronbach's alpha value). Furthermore, scales with Cronbach's alpha values below .60 were deemed unacceptable and subsequently removed (Field, 2009, p. 675).

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<sup>54</sup> Reliability analysis determines the ability of a measure to produce consistent results when the same entities are measured under different conditions (Field, 2009, p. 793).

### **5.7.3 Descriptive statistics**

Upon establishing the psychometric properties of the scale, descriptive and frequency analyses were employed to determine the prevalence of grit and the extent of retention. Descriptive statistics were also derived to assess the applicability of parametric techniques.

### **5.7.4 Inferential statistics**

#### *Correlation(s)*

Prior to conducting any predictive analyses, a Pearson's correlation coefficient<sup>55</sup> was calculated to determine the relationship between grit and student retention. Once explored, logistic regression analyses were conducted to ascertain grit's predictive value in determining retention among the sample.

#### *Logistic regressions*

In retention studies, the methods of inferential analysis have included discriminant analyses, multiple regressions, and other methods such as probit analyses and simple tabulations (Ott et al., 1984). However, if the dependent variable in a study is dichotomous in nature (i.e. consisting of two categories), both Ott et al. (1984) and Field (2018) have suggested that these methods are not the most appropriate.

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<sup>55</sup> Results from the parametric testing suggested that a Pearson's correlation is most suitable for the data, as opposed to non-parametric techniques (such as Spearman's Rho and Kendall's Tau-b).

With retention treated as a dichotomous variable in the current study (i.e. 1 = retained, 0 = not retained), the use of binary logistic regression models seemed appropriate to test the effects of the potential predictors. Logistical regression analysis, like a linear regression analysis, can be used to determine which independent variables and interactions are required to describe the outcome or dependent variable (Field, 2018). Logistical regression analysis “also enables one to develop predicted probabilities of retention for each combination of the independent variables” (Ott et al., 1984, p. 440).

Two binary logistic regressions were performed; the first of which sought to determine grit’s predictive value as a stand-alone covariate, and the second which aimed to ascertain grit’s value in determining retention over and beyond that described by previous academic performance. This second regression analysis followed a hierarchical approach, entering the independent variables/predictors in varying orders. The performance variables (i.e. the matric and undergraduate aggregates) were entered into the first block, and grit as a composite score into the second.

## **5.8 Ethical considerations**

Ethical clearance for the research study was requested and granted by the Department of Psychology at UNISA (see Appendix D). In addition to the Department’s ethical clearance, the study obtained permission from UNISA’s Research Permission Sub-committee (RPSC) to involve UNISA students (see Appendix E).

An informed consent form was developed which briefly outlined the study in a clear, concise manner; informing the students of the research’s purpose, the procedure, the risks and benefits, together with an explanation of the measures implemented to ensure confidentiality

(see Appendix C). The students were required to read the informed consent form and indicate whether they wished to participate in the study by selecting the appropriate action. A student wishing to participate was routed to the start of the survey. Alternatively, those who opted out were redirected to a custom ending point.

The students were informed that their participation in the study was voluntary. Voluntary participation implies a voluntary decision to participate in a research study without coercion or undue influence (Admur & Banker, 2011). Participants were informed of their right to withdraw their consent and to withdraw themselves from the study at any time, without penalty. The right to withdraw was stipulated in the consent form.

All the information gathered was treated confidentially. Confidentiality pertains to the treatment of information that a participant has disclosed during a research study. It involves a relationship of trust with the expectation that the information gathered will not be divulged to others in ways that are inconsistent with the understanding of the original disclosure, without permission (Oliver, 2010). In line with this, the participants were assured that the information provided by them would be held in strict confidence and that there would be no link between themselves and the data they provided, in this thesis or any subsequent research publications.

Although student numbers were requested, they were exclusively used to pair the primary data with the secondary data. Once paired, the student numbers were discarded from further analyses and did not appear in any dataset(s) thereafter. In this way, the researcher anonymised the data. The researcher explained this procedure to participants in the cover letter (see Appendix B).

Lastly, it was not anticipated that students would undergo any physical and/or emotional harm as a result of their participation. This was primarily due to the exploratory nature of the study.

## **5.9 Summary**

The current research laid its foundations in the positivist paradigm, which is commonly aligned with quantitative methods of data collection and analysis, the reliability and validity of instruments and data alike, and the generalisability of findings (Mack, 2010). Aiming to assess grit's predictive role in retaining postgraduate ODL students, a non-experimental correlational survey design ensued. Both descriptive and inferential statistics were employed to answer the research questions. Exploratory and partial confirmatory factor analyses were conducted to ascertain the psychometric rigour of the Grit-S scale, followed by correlational and logistic regression analyses to explore grit's value in determining the retention of students from one year to the next. The results from these statistical analyses are reported in the next chapter.

## CHAPTER 6: DATA ANALYSIS AND RESULTS

Chapter 6 commences with an overview of the demographic and retention profile of the sample, accompanied by a description of the levels of grit. Thereafter, the reader is guided through a series of statistical tests which were performed to explore the parametric nature of the data, so as to inform the selection of an appropriate statistical technique. What follows is an analysis of the psychometric properties of the Grit-S scale using factor analyses and Cronbach's alpha coefficients, sequentially. Lastly, the reader is guided through the statistical techniques that were used to answer the remainder of the research questions.

### 6.1 The sample

#### *Demographic attributes*<sup>56</sup>

The majority of the research participants were female ( $n = 587$ ; 70.1%), followed by 250 male participants (29.9%). Close to a quarter of the research participants was between the ages of 25-29 years ( $n = 203$ ; 24.3%). This was followed by 18.6% of the sample, who indicated that they were between the ages of 30-34 years ( $n = 156$ ). Similar frequencies were observed among the participants who were between the ages of 18-24 years ( $n = 138$ ; 16.5%) and those who were between the ages of 35-39 years ( $n = 137$ ; 16.4%). Overall, close to 60% of the sample ( $n = 496$ ; 59.3%) was between the ages of 25 and 39 years. These results are tabulated below in Table 5.

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<sup>56</sup> This study did not receive permission to obtain demographic statistics on the study population. Demographic information could only be retrieved from the participants due to the inclusion of a demographics section in the online survey. As such, under- and/or over-representation could only be established if such information was available in published material. Lamentably, no record of the demographic profile of the broader honours cohort is available, and as a result, comparisons are made based on UNISA's entire student population (where available).

**Table 5: Grouped age of the research participants**

	<b>Frequency</b>	<b>Percent</b>
18-24 years	138	16.5
25-29 years	203	24.3
30-34 years	156	18.6
35-39 years	137	16.4
40-44 years	110	13.1
45-49 years	48	5.7
50 years (or older)	45	5.4
<b>Total</b>	<b>837</b>	<b>100.0</b>

Regarding the ethnicities of the research sample, over half was African ( $n = 495$ ; 59.1%)<sup>57</sup>, while over a quarter was white ( $n = 228$ ; 27.2%)<sup>58</sup>. Similar frequencies were observed among the Indian and Coloured participants, comprising 6% and 6.1% of the sample respectively. Less than 1% of the research participants were Asian ( $n = 3$ ). These results are tabulated below.

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<sup>57</sup> Under-represented according to an internal media release (University of South Africa, n.d., p. 15); “Reflecting the demographics of South Africa, more than 77% of Unisa students are African, 12% white, 5% Indian and 6% Coloured”.

<sup>58</sup> Over-represented (University of South Africa, n.d.). See Footnote 57 above.

**Table 6: Ethnicity of the research participants**

	<b>Frequency</b>	<b>Percent</b>
African	495	59.1
Asian	3	0.4
Coloured	51	6.1
Indian	50	6.0
White	228	27.2
Other	10	1.2
<b>Total</b>	<b>837</b>	<b>100.0</b>

Regarding the disability status of the research participants, nearly all indicated that they did not have a disability ( $n = 817$ ; 97.6%). Of the 2.4% of the sample who indicated that they were disabled ( $n = 20$ ), most declared that they were affected by a mental/chemical disorder or a phobia ( $n = 7$ ; 0.8%). Others indicated visual impairments (reading difficulty,  $n = 3$ ; 0.4%), epilepsy ( $n = 2$ ; 0.2%), or muscular/skeletal/joint/limb disabilities ( $n = 2$ ; 0.2%). These and other disclosed disabilities are tabulated in Table 7 below.

**Table 7: Disclosed disabilities among the research participants**

	<b>Frequency</b>	<b>Percent</b>
Not applicable	817	97.6
Diabetes	1	0.1
Disability not mentioned	3	0.4
Epilepsy	2	0.2
Mental/chemical disorders/phobias	7	0.8
Multiple disabilities	1	0.1
Muscular/skeletal/joint/limb	2	0.2
Quadriplegic	1	0.1
Visually impaired (Reading difficulty)	3	0.4
<b>Total</b>	<b>837</b>	<b>100.0</b>

Most of the research participants were English-speaking ( $n = 237$ ; 28.3%). Afrikaans and isiZulu were also prominent among the sample, comprising 14.9% ( $n = 125$ ) and 14.5% ( $n = 121$ ) respectively. These were followed by Setswana- ( $n = 62$ ) and Northern Sotho-speaking participants ( $n = 59$ ). Further results are tabulated below in Table 8.

**Table 8: Home language of the research participants**

	<b>Frequency</b>	<b>Percent</b>
Afrikaans	125	14.9
English	237	28.3
French	3	0.4
German	2	0.2
isiNdebele	14	1.7
isiXhosa	50	6.0
isiZulu	121	14.5
Northern Sotho	59	7.0
Sesotho	45	5.4
Setswana	62	7.4
Shona	30	3.6
SiSwati	20	2.4
Tshivenda	28	3.3
Xitsonga	25	3.0
Other African Language	9	1.1
Other Foreign Language	7	0.8
<b>Total</b>	<b>837</b>	<b>100.0</b>

Although not to the same proportion, the research participants mimic the broader student population, with the majority being female, mostly African (see Table 6), between the ages of 25 and 39 years (see Table 5), and presenting with no disabilities (see Table 7) (Tloubatla et al., 2016; University of South Africa, 2016a). However, it remains unknown whether the

sample is representative of the broader population in terms of the home languages spoken. As such, systematic bias in this regard cannot be ruled out.

***Levels of grit***

On average, the sample scored towards the higher end of the Grit-S scale ( $\bar{x} = 3.82$ ;  $SD = .619$ ). The minimum grit score obtained among the participants stood at 2.00, while the maximum grit score stood at 5.00. Using the 68-95-99% rule (Galarnyk, 2018), further scrutiny of the  $SD$  revealed that 68% of the sample scored between 3.20 ( $\bar{x} - 1SD$ ) and 4.44 ( $\bar{x} + 1SD$ ) on the Grit-S scale. These descriptive statistics are shown in Table 9 below.

**Table 9: Grit: Descriptive statistics**

	<i>n</i>	Min.	Max.	$\bar{x}$	<i>SD</i>	Skewness	SE	Kurtosis	SE
Grit-S	837	2.00	5.00	3.82	0.619	-0.290	0.085	-0.495	0.169

As far as the two dimensions are concerned, results from the descriptive analysis revealed that, on average, participants scored higher on the perseverance subscale ( $\bar{x} = 4.09$ ,  $SD = .670$ ) than on the consistency of interest subscale ( $\bar{x} = 3.55$ ,  $SD = .881$ ). Both subscales also had larger standard deviations when compared to the composite grit scores, therein suggesting a wider dispersion around the mean. These statistics are shown in Table 10.

**Table 10: Passion and Perseverance: Descriptive statistics**

	<i>n</i>	Min.	Max.	$\bar{x}$	<i>SD</i>	Skewness	SE	Kurtosis	SE
Passion	837	1	5	3.55	0.881	-0.444	0.085	-0.470	0.169
Perseverance	837	1	5	4.09	0.670	-0.995	0.085	1.759	0.169

***Retention status***

Of the 837 honours participants, a total of 327 students were not retained in the following academic year (39.1%). Over 60%, on the other hand, successfully registered for their subsequent year of studies ( $n = 510$ ). These respective frequencies and percentages are tabulated in Table 11 below.

**Table 11: Retention status**

	Frequency	Percent
Not retained	327	39.1
Retained	510	60.9
<b>Total</b>	<b>837</b>	<b>100.0</b>

**6.2 Exploring assumptions**

As Field (2009; 2018) rightly indicates, parametric tests performed on non-parametric data are likely to produce inaccurate findings. As such, it is crucial to check the assumptions before deciding on the appropriateness of a statistical test. For this reason, prior to conducting the aforementioned descriptive or inferential analyses (mentioned in Chapter 5),

the parametric assumptions of the Grit-S data were explored. The following parametric assumptions were checked:

1. Normally distributed data;
2. Homogeneity of variance;
3. Multicollinearity;
4. Independence; and
5. Interval data.

### **6.2.1 Normally distributed data**

The distribution of the Grit-S data was established using a triangulation of methods. Firstly, the statistics derived from the Kolmogorov-Smirnov (K-S) test and Shapiro-Wilk test<sup>59</sup> were assessed. According to Field (2009), a non-significant  $p$ -value ( $>.05$ ) in either test is indicative of a normal distribution, whereas a significant  $p$ -value ( $<.05$ ) denotes a significantly different distribution (i.e. non-normal). The K-S test revealed that the Grit-S data was significantly non-normal,  $D(837) = 0.07$ ,  $p < .01$ , as did the Shapiro-Wilk test. These results are shown in Table 12.

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<sup>59</sup> The K-S test and the Shapiro-Wilk test compare the scores in the sample to a normally distributed set of scores with the same mean and standard deviation (Field, 2009, p. 44).

**Table 12: Tests of Normality**

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	<i>df</i>	Sig.	Statistic	<i>df</i>	Sig.
Grit-S	0.070	837	0.000	0.983	837	0.000

However, caution should be applied when interpreting this finding. Due to the large sample size in the current study ( $n = 837$ ), it is easy to obtain significant results from small deviations from normality (Field, 2009). Thus, “a significant result does not necessarily indicate whether the deviation from normality is enough to bias any statistical procedures that may be applied to the data” (Field, 2009, p. 144).

Secondly, descriptive statistics, particularly the measures of skewness and kurtosis, were derived and used to ascertain the distribution of the grit data (Field, 2009). These statistics<sup>60</sup> were calculated and then divided by their respective standard errors (SE) to produce  $z$ -scores. The resulting  $z$ -scores were then benchmarked using the suggested cut-off reported in Field (2009)<sup>61</sup>;  $z$ -scores above 3.29 are considered significantly skewed, or significantly non-normal. While significantly skewed ( $z = 3.41$ ), the measure of kurtosis does not suggest a peaked distribution ( $z = 2.93$ ). These statistics are tabulated below.

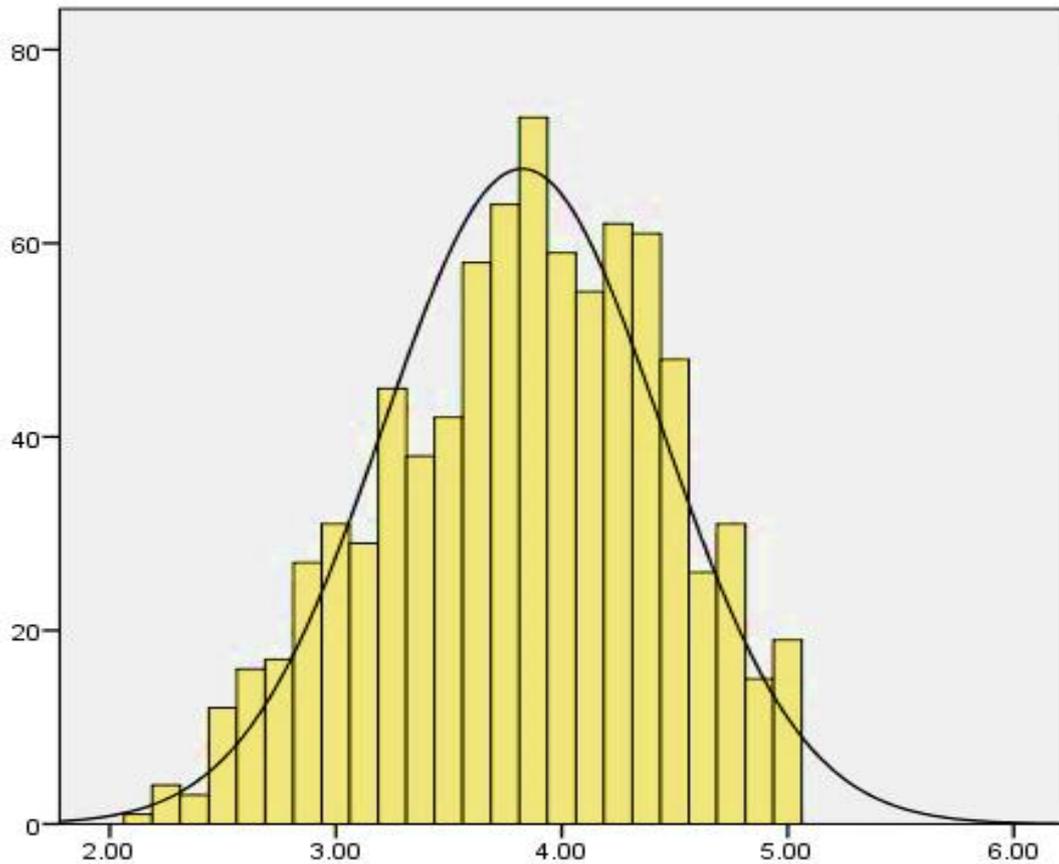
<sup>60</sup> Ignoring the minus sign as suggested in Field (2009).

<sup>61</sup> Field (2009) suggests an upper-bound cut-off of 3.29.

**Table 13: Descriptive statistics**

	<i>n</i>	$\bar{x}$	<i>SD</i>	<b>Skewness</b>	<b>SE</b>	<i>z</i>	<b>Kurtosis</b>	<b>SE</b>	<i>z</i>
Grit-S	837	3.82	0.619	-0.290	0.085	3.41	-0.495	0.169	2.93

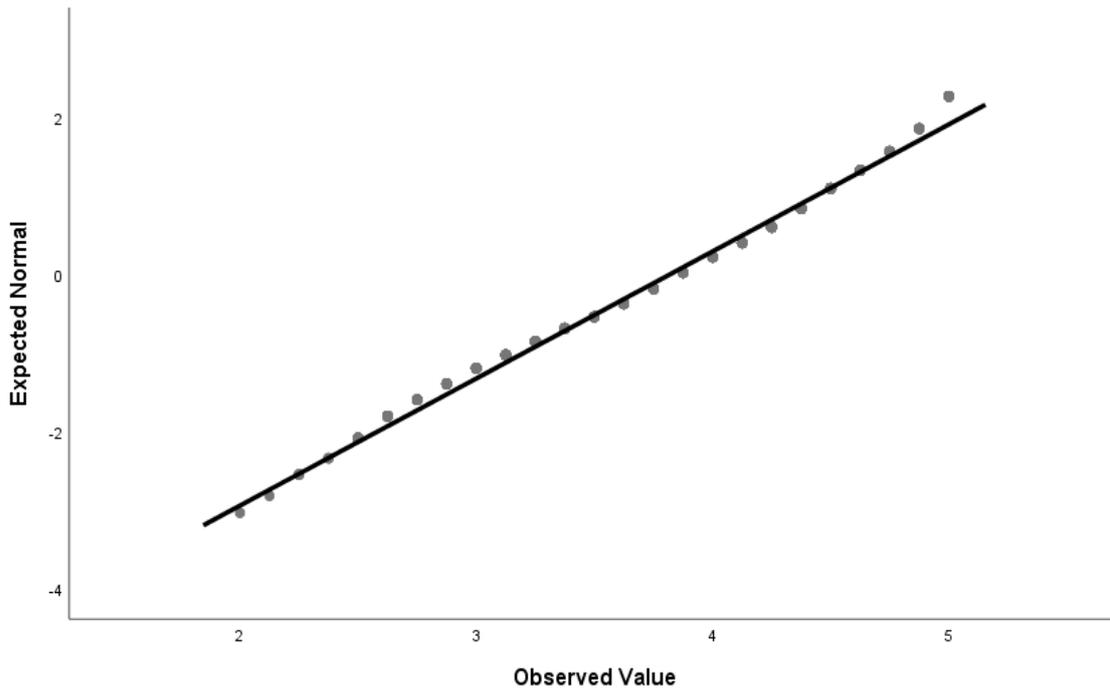
The third and fourth measures involved the inspection of the Grit-S histogram and the Q-Q plot respectively. Both the histogram and the Q-Q plot resembled a relatively normal distribution. The histogram with a normal distribution overlaid is shown below, followed by the Q-Q plot.



**Figure 6: Histogram: Grit-S data**

While some instances in the analysis have suggested the violation of the normality assumption, “the central limit theorem suggests that, in large samples, the sampling

distribution tends to be normal either way, regardless of the shape of the data actually collected” (Field, 2009, p. 134). In addition to this commonly-reported theory, the histogram and Q-Q plot appear relatively normal (see Figures 6 and 7). As such, the assumption of normality was considered tenable among the current sample.



*Figure 7: Q-Q plot: Grit-S data*

### **6.2.2 Homogeneity of variance**

Homogeneity of variance, or homeoscadacity, assumes “that the spread of scores is roughly equal in different groups of cases, or that the spread of scores is roughly equal at different points on the predictor variable” (Field, 2009, p. 152). In this case, homeoscadacity will refer to the former, assuming that the spread of grit scores is roughly equal in the retained and non-retained participants.

Levene’s test can be used to ascertain equal variance. In the event that Levene’s test is significant ( $p \leq .05$ ), it can be concluded that the variances are significantly different (Field, 2009). In that case, the assumption has been violated. Alternatively, a non-significant (*ns*) finding implies that the variances are roughly equal and the assumption is tenable. Results from Levene’s test (Table 14) suggested that the variances (in the mean grit scores) were roughly equal among the retained and non-retained participants,  $F(1, 835) = 3.76$ , *ns*. As such, the assumption of homoscedasticity, among the current sample of honours students, was tenable.

**Table 14: Test of Homogeneity of Variance**

	<b>Levene Statistic</b>	<i>df1</i>	<i>df2</i>	<b>Sig.</b>	
	Based on Mean	3.759	1	835	0.053
Grit-S	Based on Median	2.731	1	835	0.099
	Based on Median and with adjusted <i>df</i>	2.731	1	824.407	0.099
	Based on trimmed mean	3.551	1	835	0.060

### 6.2.3 Multicollinearity

Field (2009) suggests that not only should there not be any perfect linear relationships between two or more of the predictors (correlation of 1.00, regardless of direction), but that predictor variables should not correlate too highly with one another either (correlations above .80 or .90, regardless of direction). Multicollinearity (between grit and the matric and undergraduate aggregates) was inspected using collinearity coefficients, namely tolerance and variance inflation factor (VIF) statistics reported in a linear regression.

According to Menard (1995) and Myers (1990), as cited in Field (2009), a Tolerance value less than 0.1 and a VIF value greater than 10 indicate a collinearity problem. Results from this analysis revealed satisfactory tolerance ( $\geq .93$ ) and VIF values ( $\leq 1.076$ ), therein suggesting the assumption was tenable, and had not been violated. The collinearity statistics are tabulated below.

**Table 15: Collinearity Statistics**

<b>Model</b>	<b>Collinearity Statistics</b>	
	<b>Tolerance</b>	<b>VIF</b>
Grit-S	0.946	1.057
Matric aggregate	0.930	1.076
Undergraduate aggregate	0.959	1.042

Dependent Variable: Retention

#### **6.2.4 Interval data**

This assumption recommends that data be measured at least at the interval level, in the event of parametric testing. While grit items are scored on a 5-point Likert-scale, the average of these points is derived and used to represent a participant's grit score (Duckworth & Quinn, 2009). It is this score to which statistical techniques are applied, and not the Likert data. As such, the assumption of interval data was deemed plausible.

### **6.2.5 Independence of errors**

In the current context, the assumption of independence states that data from different student participants should be independent, suggesting that the behaviour of one participant does not influence the behaviour of another (Field, 2009). The individual, online nature of research design and the fact that participants could only complete the survey once, suggest the cases of data are not related, and have not violated the assumption of independence.

Having tested the parametric assumptions, the focus now shifts to answering the research questions, adopting parametric techniques. What follows is an overview of the exploratory and partial confirmatory factor analyses together with the item analysis, in order to answer the first research question.

### **6.3 The psychometric properties of the Grit-S scale**

*RQ1: Is the Grit-S scale a valid and reliable instrument for use within a South African ODL context?*

The validity and reliability of the Grit-S scale were assessed utilising an exploratory factor analysis (EFA) and an item analysis respectively. A partial confirmatory factor analysis (PCFA) was also briefly explored (Gignac, 2009), in an effort to supplement the results from the EFA and confirm the factor structure put forth by Duckworth and Quinn (2009).

### 6.3.1 Validity

Prior to conducting the factor analyses, the factorability of the 8 Likert items in the Grit-S scale was assessed. To do so, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was adopted, as was Bartlett's test of sphericity. The KMO measure of sampling adequacy tests whether the partial correlations among variables are small (Field, 2009; 2018). As a rule, the KMO statistic ought to be, at the bare minimum, greater than 0.5 in order to proceed with a satisfactory factor analysis (Field, 2009, p. 660). Results from the current analysis yielded a KMO value of .78, thereby verifying the sampling adequacy. This can be seen in Table 16 below.

**Table 16: KMO and Bartlett's Test**

Kaiser-Meyer-Olkin measure of sampling adequacy		0.779
	Approx. Chi-Square	1758.98
Bartlett's test of sphericity	<i>df</i>	28
	Sig.	0.000

Next, Bartlett's test of sphericity was examined. This test assists researchers in deciphering whether the correlation matrix is significantly different from an identity matrix (Field, 2009, p. 607). If the *p*-value of Bartlett's test is below .05, then it can safely be assumed that "the correlations between the variables are significantly different from zero, and that there is a significantly strong enough relationship to conduct a factor analysis on the items" (Field, 2009, p. 660).

The null model chi-square, derived from Bartlett's test of sphericity, indicated that there is a significantly strong enough relationship among the items to conduct a factor analysis,

$\chi^2(28) = 1758.98, p < .001$ . Based on this, and the KMO value, factor analysis in the current study was deemed suitable and likely to produce satisfactory results.

### 6.3.1.1 Exploratory factor analysis (EFA)

Following the results of the factorability tests, an exploratory factor analysis (EFA) with an oblique rotation (oblimin) was conducted, and eigenvalues obtained. An eigenvalue indicates how much of the total variance of all variables is covered by the factor (Field, 2018; Kaiser, 1974). The Kaiser rule suggests retaining only those components or factors with associated eigenvalues greater than one (Kaiser, 1960). Two components (out of eight components) had eigenvalues over Kaiser’s criterion, and in combination explained 57.22% of the variance in the data. These results, and others, are shown in Table 17.

**Table 17: Total variance explained by the components**

Component/factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.993	37.411	37.411
2	1.585	19.813	57.224
3	0.936	11.698	68.922
4	0.647	8.082	77.004
5	0.537	6.707	83.711
6	0.512	6.398	90.109
7	0.452	5.650	95.759
8	0.339	4.241	100.000

After examining the eigenvalues and both the individual and the cumulative variance explained by the two factors, the factor loadings in the pattern matrix were inspected. Results revealed that questions 1, 3, 5 and 6 loaded onto component 1, while questions 2, 4, 7 and 8 loaded onto component 2. Closer inspection of these factor loadings revealed that component/factor 1 reflected the *passion* subscale, while component 2 reflected the *perseverance* subscale. This is shown in Table 18.

**Table 18: Pattern matrix from EFA**

Item	Factor 1	Factor 2
	<i>Passion</i>	<i>Perseverance</i>
I have been obsessed with a certain idea or project for a short time but later lost interest (Q3)	.781	-.007
I often set a goal but later choose to pursue a different one (Q5)	.778	.030
I have difficulty maintaining my focus on projects that take more than a few months to complete (Q6)	.760	.113
New ideas and projects sometimes distract me from previous ones (Q1)	.729	-.061
I am diligent (Q8)	.145	.825
I am a hard worker (Q4)	.037	.801
I finish whatever I begin (Q7)	.225	.742
Setbacks don't discourage me (Q2)	-.154	.406

Extraction Method: Principal component analysis with oblimin rotation.

Rotation converged in 5 iterations.

Results from the EFA indicated that the same two distinct components, and respective factor structures, as indicated by Duckworth and colleagues (2007, 2009), lay beneath the surface of the Grit-S scale among a South African ODL sample. Cumulatively, these two factors (i.e. consistency of interest and perseverance of effort) were able to account for 57.22% of the variance. Although the analysis suggests the removal of Question 2 (*Setbacks don't discourage me*),<sup>62</sup> this item is intraneous to the core concept of grit, and as a result, its inclusion is necessary to avoid construct under-representation (Furr & Bacharach, 2014).

### **6.3.1.2 Partial confirmatory factor analysis (PCFA)**

Seeking to confirm the two-factor structure and supplement the EFA results (Gignac, 2009), a PCFA was conducted. Having already established the factorability of the Grit-S scale, a maximum likelihood estimation (MLE) with an oblimin rotation was performed. Preliminary results from the pattern matrix revealed parallel results to those reported above. See Table 19.

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<sup>62</sup> In Duckworth and Quinn's (2009) psychometric analysis of the Grit-S scale, item 2 (i.e. *Setbacks don't discourage me*) exhibited a factor loading of 0.37.

**Table 19: Pattern matrix from PCFA<sup>63</sup>**

Item	Factor 1	Factor 2
I am diligent (Q8)	.848	.075
I finish whatever I begin (Q7)	.654	.184
I am a hard worker (Q4)	.653	.034
Setbacks don't discourage me (Q2)	.191	-.045
I often set a goal but later choose to pursue a different one (Q5)	.010	.710
I have difficulty maintaining my focus on projects that take more than a few months to complete (Q6)	.069	.697
I have been obsessed with a certain idea or project for a short time but later lost interest (Q3)	-.010	.694
New ideas and projects sometimes distract me from previous ones (Q1)	-.028	.589

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Extraction Method: Maximum Likelihood with oblimin rotation.

Rotation converged in 4 iterations.

Next, the null model chi-square and the implied model chi-square were derived using Bartlett's test of sphericity and the goodness-of-fit test respectively (Gignac, 2009). Results from the current analysis revealed a null model chi-square of  $\chi^2(28) = 1758.98, p < .001$ , and an implied model chi-square of  $\chi^2(13) = 28.42, p < .01$ . These results are tabulated in Table 20.

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<sup>63</sup> Factor 1 and Factor 2 are in opposite order to that reported in the EFA.

**Table 20: Bartlett's test of sphericity and the Goodness-of-fit Test**

	<b>Chi-Square</b>	<b><i>df</i></b>	<b>Sig.</b>
Null model	1758.98	28	.000
Implied model	28.42	13	.008

Although the goodness-of-fit test (i.e. the implied model chi-square) is the most commonly used test to determine model accuracy (DeCoster, 1998; Gignac, 2009), this test is highly sensitive to the sample size, with large samples generally giving rise to results that lead to the rejection of the null hypothesis, when in fact, the factor solution is appropriate (DeCoster, 1998; Gignac, 2009). As a result, this statistic has been abandoned in PCFA, in favour of examining multiple indices of fit together with the pattern matrix.

Consequently, a number of close-fit indexes have been advocated, most of which are derived from a formulation that either incorporates both the null model and implied model chi-square (known as incremental close-fit indexes) or others that are based on a formulation or procedure that incorporates information exclusively from the implied model solution (known as absolute close-fit indexes (Hu & Bentler, 1999). (Gignac, 2009, p. 41).

As such, in addition to assessing the pattern matrix, a total of five close-fit indices were calculated using the null model chi-square, the implied model chi-square, and in some instances, the sample size (Gignac, 2009). These indices included:

- The root mean square error of approximation (RMSEA);

- The standardised root mean residual (SRMR);
- The normed fit index (NFI);
- The Tucker–Lewis Index (TLI); and
- The comparative fit index (CFI).<sup>64</sup>

Based on the preceding two chi-square values, the close-fit indices were calculated. Results from the analysis revealed a NFI of .984, a TLI of .981, a CFI of .991, and a RMSEA of .038. Based on the corresponding residual correlation matrix, SRMR was calculated at .020. As reported by Hooper, Coughlan and Mullen (2008) and Kline (2016), the NFI and TLI should exhibit an index value  $\geq .950$  (for good fit), while the cut-off for the CFI is slightly lower, suggested at .900. As for the other two close-fit indices, the index value for both RMSEA and SRMR should be smaller than .08 (Hooper et al., 2008; Kline (2016). Values closer to 0 (in these cases) are indicative of a progressively better-fitting model (Hu & Bentler, 1999).

Thus, if one were to consider the close-fit indexes collectively, as commonly recommended by Hu and Bentler (1999), and the other outputs from the PCFA and the former EFA, the two-factor model solution would be considered acceptable.

### **6.3.2 Reliability**

Reliability refers to whether an instrument yields or is likely to yield similar and consistent results in the future under different circumstances (Field, 2009). Reliability measures consistency within a research instrument and is therefore also referred to as internal

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<sup>64</sup> Details of the formulae can be found in Gignac (2009).

consistency. To test the reliability of the two dimensions in the Grit-S scale, an item analysis was performed, and Cronbach's alpha values obtained. Generally, Cronbach's alpha values are interpreted in the following way(s): a value above .80 is considered good; a value between .60 and .80 is acceptable; and a value below .60 is considered unacceptable (Field, 2009, p. 675).

The item analyses yielded acceptable Cronbach alpha values: .77 for Consistency of interest (four items), .62 for Perseverance of effort (four items), and .72 for the Grit-S scale. Despite the suggestion from the item analysis to remove Question 2 (see Table 21), its deletion does not substantially improve item reliability of the scale, and therefore it was not excluded from subsequent analyses. Moreover, and perhaps more importantly, because the item is intraneous to the core construct, its inclusion is crucial to avoid construct under-representation, as mentioned above (Furr & Bacharach, 2014).

**Table 21: Reliability of the Grit-S scale**

	<b>Number of items</b>	$\bar{x}$ ( <i>SD</i> )	<b>Skewness</b>	<b>Kurtosis</b>	$\alpha$
Consistency of interest (Q1, Q3, Q5, Q6)	4	3.55 (0.88)	-0.444	-0.470	.77
Perseverance of effort (Q2, Q4, Q7, Q8)	4/3*	4.09 (0.67)	-0.995	1.759	.62/.79*
Grit-S (Q1-Q8)	8/7*	3.82 (0.62)	-0.290	-0.495	.72/.77*

\*Cronbach alpha/scale if item deleted

Overall, the results from the EFA, PCFA, and the reliability (item) analysis revealed that the Grit-S scale is soundly valid and reliable among the sample from which the data was derived.

Results from the EFA and PCFA revealed that the same two-factor structure put forth by Duckworth et al. (2007), consistency of interest and perseverance of effort, lay beneath the surface of the Grit-S scale among a South African ODL sample. The item analyses, on a similar note, demonstrated the constructs' reliability, yielding acceptable Cronbach's alpha values.

#### **6.4 Pearson's correlation**

*RQ2: Is there a statistically significant relationship between grit and postgraduate student retention within a South African ODL institution?*

To answer the second research question, a Pearson's correlation coefficient was envisioned. This inferential technique is a parametric test based on the normal distribution, assuming a normal sampling distribution and interval data (Field, 2009). However, there is one exception to the latter: "one of the variables can be a categorical variable (i.e. retention) provided there are only two categories" (Field, 2009, p. 177). Seeing that these assumptions have already been met, a Pearson's correlation coefficient was calculated and used to ascertain the relationship between grit and student retention. In addition, the correlation coefficient was squared ( $r^2$ ) to ascertain the amount of variance explained by the independent variable (i.e. grit).

Results from the analysis revealed that psychological grit and retention are not statistically related,  $r(835) = .03, ns$ . Further scrutiny of Pearson's  $r$  revealed that grit accounted for less than 1% of the variance (0.12%) among the current sample. This correlation and its associated statistics are tabulated in Table 22.

**Table 22: Correlations**

		<b>Grit-S</b>	<b>Retention</b>
Grit-S	Pearson Correlation	1	.034
	Sig. (2-tailed)		.326
	<i>N</i>	837	837
Retention	Pearson Correlation	.034	1
	Sig. (2-tailed)	.326	
	<i>N</i>	837	837

## **6.5 Binary logistic regressions**

Two binary logistic regressions were performed in SPSS, 1) to ascertain the predictive value of grit in determining retention, and 2) to determine whether grit significantly contributes to the retention model when controlling for the matric and undergraduate aggregates.

### **6.5.1 Grit**

*RQ3: Is grit a significant predictor of postgraduate student retention within a South African ODL institution?*

A binary logistic regression was planned to ascertain the predictive value of grit in determining postgraduate retention among ODL students. While the major assumptions relating to parametric statistics have been checked, the assumption of linearity (as it relates to logistic regression) has not. The assumption of linearity in logistic regression assumes that “there is a linear relationship between any continuous predictors and the logit of the outcome variable” (Field, 2009, p. 273).

This assumption can be checked by testing whether the interaction term between the predictor and its log transformation is significant (Hosmer & Lemeshow, 1989, as cited in Field, 2009). If the interaction is significant, then the main effect has violated the assumption. In the current analysis, however, the interactions had significance values greater than .05, indicating that the assumption(s) of linearity of the logit has been met. These statistics are shown below.

**Table 23: Variables in the Equation**

	$\beta$	S.E.	Wald	<i>df</i>	Sig.	Exp( $\beta$ )
Grit-S	1.038	4.814	0.047	1	.829	2.824
Grit-S by LnGrit-S	-0.481	2.094	0.053	1	.818	0.618
Matric aggregate	-1.103	1.165	0.897	1	.344	0.332
Matric by LnMatric	0.430	0.518	0.689	1	.407	1.538
Undergraduate aggregate	0.590	0.459	1.656	1	.198	1.804
Constant	-0.908	7.824	0.013	1	.908	0.403

a. Variable(s) entered on Step 1: Matric aggregate, Undergraduate aggregate, Grit-S, Grit-S\*LnGrit-S, Matric aggregate\*LnMatric

Once the parametric assumptions of the logistical regression had been satisfied (linearity of the logit, independence, and multicollinearity), the analysis was conducted in SPSS. Grit scores were entered into the model on their own, in order to ascertain the individual predictive power of grit in determining retention of the participants. These results are discussed below.

Results from Step 0<sup>65</sup> of the logistical regression revealed that when only the constant was included in the model, the model correctly classified 60.9%<sup>66</sup> of the participants (into either the retained or not retained categories). However, it must be noted that the model predicted that all students would be retained. See the classification table below.

**Table 24: Step 0: Classification table**

Observed		Predicted		
		Retention		Percentage
		Not retained	Retained	Correct
Step 0	Retention	0	327	0.0
	Retained	0	510	100.0
Overall Percentage				60.9

Next, the residual chi-square (otherwise referred to as the *Overall statistics*) found in the ‘Variables not in the Equation’ table was analysed. This statistic provides an indication of whether the coefficients for the variables not in the model are significantly different from zero (Field, 2009). If the probability for the residual chi-square is significant, then it can be concluded that the addition of *one or more* of these variables to the model will affect its predictive power significantly. On the other hand, if the probability is not significant (i.e. greater than .05), this suggests that *none* of the proposed variables significantly contribute to the model’s predictive power (Field, 2009; 2018). Results from the analysis revealed that forcing the Grit-S data into the model would *not* make a significant contribution ( $p = .325$ )

<sup>65</sup> Regression analyses allow one to have different steps in a model. The difference between the steps rests on the predictors that are included. The first step, called Step 0, includes no predictors. Subsequent steps (Steps 1, 2, etc.) include predictors.

<sup>66</sup> Also referred to as classification accuracy.

in determining the outcome, i.e. the retention of participants. These results are shown in Table 25.

**Table 25: Step 0: Variables not in the Equation**

		Score	df	Sig.
Variables	Grit-S	0.967	1	.325
Overall statistics		0.967	1	.325

Concomitant results revealed in Step 1<sup>67</sup> suggested that the Grit-S is not a significant predictor of student retention. Results from the table below indicate that an increase in a participant's grit score does not significantly increase the likelihood (or the odds) of him or her being retained ( $\beta = .113$ ,  $OR = 1.12$ ,  $p = .33$ ). The beta values, standard errors, and the significance statistics for this model are tabulated below.

**Table 26: Step 1: Variables in the Equation<sup>a</sup>**

	$\beta$	S.E.	Wald	df	Sig.	Exp( $\beta$ )	95% CI for Exp( $\beta$ )	
							Lower	Upper
Grit-S	0.113	0.114	0.966	1	.326	1.119	0.894	1.401
Constant	0.015	0.442	0.001	1	.937	1.015		

a. Variable(s) entered on Step 1: Grit-S.

<sup>67</sup> Step 1 – This is the first step (or model) with predictors in it.

## 6.5.2 Over and above previous academic performance

*RQ4: Does grit predict retention when controlling for previous academic performance?*

Results from the preceding section indicated that an increase in a participant's grit score does not significantly increase the likelihood (or the odds) of being retained ( $p = .33$ ). While this is the case when only one predictor is included in the equation, the second research question sought to determine whether grit could account for additional variance when controlling for previous academic performance (i.e. the matric and undergraduate aggregates).

A hierarchical approach was adopted. Matric performance (operationalised using the matric aggregates) and aggregated undergraduate performance was entered into the first step of the regression, followed by grit scores in the second. Prior to performing and reporting the analysis, it must be noted that due to the limited responses in the matric aggregate variable (*I can't remember* was recoded to represent missing data); only 215 cases were processed. This is shown in the table below.

**Table 27: Case processing summary**

Unweighted Cases		Frequency	Percent
	Included in Analysis	215	25.7
Selected Cases	Missing Cases	622	74.3
	Total	837	100.0
Unselected Cases		0	0.0
<b>Total</b>		<b>837</b>	<b>100.0</b>

Results from the classification table revealed that during Step 0 (i.e. when only the constant is included; no predictors), the model achieved 62.8% classification accuracy. Further results revealed that the inclusion of the matric and undergraduate aggregates into the equation would not increase the model's predictive value significantly. This is shown in the table below.

**Table 28: Step 0: Variables not in the Equation**

		<b>Score</b>	<b><i>df</i></b>	<b>Sig.</b>
Variables	Matric aggregate	0.929	1	.335
	Undergraduate aggregate	1.659	1	.198
Overall Statistics		3.058	2	.217

Step 1 of the regression equation outlined the predictive value of the matric and undergraduate aggregates when included in the model. The model's accuracy did not increase and remained at 62.8%. Further results confirmed the non-significance of these performance aggregates in determining retention, producing unstandardised betas ( $\beta$ ) of -.14 ( $p = .23$ ) for matric aggregates, and .65 ( $p = .15$ ) for undergraduate aggregates. The *ORs* stood at .87 and 1.91, respectively. These statistics are tabulated below.

**Table 29: Step 1: Variables in the Equation<sup>a</sup>**

	$\beta$	S.E.	Wald	df	Sig.	Exp( $\beta$ )	95% CI for	
							Exp( $\beta$ )	
							Lower	Upper
Matric	-0.136	0.114	1.419	1	.234	0.873	0.699	1.091
Undergraduate	0.648	0.448	2.088	1	.148	1.911	0.794	4.602
Constant	-1.009	1.394	0.524	1	.469	0.365		

a. Variable(s) entered on Step 1: Matric aggregates and undergraduate aggregates.

Grit was then added into the equation (Step 2). Results from this step revealed that, when added to the regression equation, the Grit-S scores decreased the overall classification accuracy of the retention model (to 62.3%). Moreover, while a reduction is evident in the -2LL (-2 Log likelihood) between Steps 1 and 2, therein suggesting a better fitting model than the previous iteration (Field, 2009), the difference is minuscule, as can be seen in Table 30 below.

**Table 30: Model summary**

	-2LL	Cox & Snell ( $r^2$ )	Nagelkerke ( $r^2$ )
Matric and undergraduate aggregates	280.662	.015	.020
Matric, undergraduate aggregates, and Grit-S	280.471	.015	.021

Further analysis of Table 30 suggested that the first model accounted for 2% of the variation in the retention rates (using Nagelkerke's measure; see Field, 2009, for a description of the measure). The inclusion of grit increased the variance explained by a mere 0.1%. Despite

the slight reduction in the -2LL, suggestive of a better fitting model, the final equation was not a significant fit of the data,  $\chi^2(3) = 3.36, p = .340$ ). Further analysis of the results indicated that neither grit ( $\beta = -.103, OR = .902, p = .663$ ), nor the matric ( $\beta = -.146, OR = .864, p = .210$ ) or undergraduate aggregates ( $\beta = .668, OR = 1.950, p = .138$ ) significantly predicted retention among the sample. The regression coefficients of the final model are tabulated below.

**Table 31: Step 2: Variables in the Equation<sup>a</sup>**

	$\beta$	S.E.	Wald	df	Sig.	Exp( $\beta$ )	95% CI for	
							Exp( $\beta$ )	
							Lower	Upper
Matric	-0.146	0.117	1.571	1	.210	0.864	0.688	1.086
Undergraduate	0.668	0.450	2.202	1	.138	1.950	0.807	4.714
Grit-S	-0.103	0.236	0.190	1	.663	0.902	0.568	1.432
Constant	-0.640	1.630	0.154	1	.694	0.527		

a. Variable(s) entered on Step 2: Grit-S scores.

## 6.6 Supplementary analyses

Having established the predictive validity (or lack thereof) among the key variables in the current study, an analysis of the remaining variables (i.e. demographic attributes and workload) followed. Gender, age, ethnicity, home language, employment status, disability status, and workload were entered simultaneously into a logistic regression equation to ascertain their value, if any, in determining retention among this sample. All cases were selected, as seen in Table 32.

**Table 32: Case processing summary**

		Frequency	Percent
Selected Cases	Included in Analysis	837	100.0
	Missing Cases	0	0.0
	Total	837	100.0
Unselected Cases		0	0.0
Total		837	100.0

Results from the initial classification revealed that when only the constant is included, the model achieves 60.9% classification accuracy. Further results revealed that the inclusion of gender, age, ethnicity, employment- and disability-status into the equation would *not* significantly increase the model's classification accuracy. The inclusion of home language and workload, on the other hand, would. This is shown below in Table 33.

**Table 33: Step 0: Variables not in the Equation**

		Score	df	Sig.
Variables	Gender (Male)	.067	1	.796
	Age	.522	1	.470
	Ethnicity (African)	2.907	5	.714
	Ethnicity (Asian)	.963	1	.326
	Ethnicity (Coloured)	.325	1	.569
	Ethnicity (Indian)	.019	1	.889
	Ethnicity (Other)	.004	1	.952
	Ethnicity (White)	1.590	1	.207
	Home language (English)	17.371	15	.297

Home language (Afrikaans)	.054	1	.817
Home language (French)	1.930	1	.165
Home language (German)	.101	1	.751
Home language (isiNdebele)	3.673	1	.055
Home language (isiXhosa)	.075	1	.784
Home language (isiZulu)	.001	1	.981
Home language (Northern Sotho)	.713	1	.399
Home language (Other African language)	.126	1	.723
Home language (Other Foreign language)	6.452	1	.011
Home language (Sesotho)	.017	1	.895
Home language (Setswana)	1.996	1	.158
Home language (Shona)	.755	1	.385
Home language (SiSwati)	.303	1	.582
Home language (Tshivenda)	.584	1	.445
Home language (Xitsonga)	.009	1	.923
Employment status (Employed)	4.255	4	.373
Employment status (Full-time student)	2.202	1	.138
Employment status (Not classified)	.678	1	.410
Employment status (Unemployed)	.308	1	.579
Employment status (Unknown)	.642	1	.423
Disability (Yes)	1.029	1	.310
Workload	32.395	1	.000
Overall Statistics	55.227	28	.002

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Forcing these variables into the regression model led to a 1.6% increase in classification accuracy (from 60.9% to 62.5%). Although slight, the -2LL and its associated chi-square,  $\chi^2(28) = 58.43, p < .01$ , suggested that the model was a significant fit of the data, and able to account for 9.1% of the variance (using Nagelkerke's measure). This is shown in Table 34 below.

**Table 34: Model summary**

	-2LL	Cox & Snell ( $r^2$ )	Nagelkerke ( $r^2$ )
Gender, age, ethnicity, home language, employment and disability status, and workload	1061.565	.067	.091

Although the final model is a significant fit to the data, when examining the variables in the equation, it is apparent that home language (isiNdebele:  $\beta = 1.96, OR = 7.09, p < .05$ ; and other foreign languages:  $\beta = -2.46, OR = .09, p < .05$ ) and workload ( $\beta = -.26, OR = .77, p < .01$ ) are the only significant predictors in the model. Further scrutiny of these betas suggests that isiNdebele speakers are more likely to be retained when compared to the majority of the sample (i.e., English speakers); other foreign language speakers are less likely to be retained when compared to the majority; and as workload increases by one unit (i.e. by one module), the odds of being retained decrease. These betas, standard errors and Wald statistics are presented in Table 35.

**Table 35: Step 1: Variables in the Equation<sup>a</sup>**

	$\beta$	S.E.	Wald	df	Sig.	Exp( $\beta$ )	95% CI for	
							EXP( $\beta$ )	
							Lower	Upper
Gender (Male)	-.012	.163	.006	1	.939	.988	.717	1.360
Age	-.002	.009	.077	1	.782	.998	.980	1.015
Ethnicity (African)			2.763	5	.737			
Ethnicity (Asian)	-.700	1.295	.292	1	.589	.496	.039	6.285
Ethnicity (Coloured)	.511	.480	1.131	1	.288	1.667	.650	4.274
Ethnicity (Indian)	.343	.478	.515	1	.473	1.409	.552	3.591
Ethnicity (Other)	1.037	.839	1.527	1	.217	2.821	.545	14.618
Ethnicity (White)	.347	.413	.707	1	.400	1.415	.630	3.179
HL (English)			13.092	15	.595			
HL (Afrikaans)	.035	.253	.019	1	.890	1.036	.630	1.702
HL (French)	21.23	23185.06	.000	1	.999	1661918244	.000	.
HL (German)	-.446	1.438	.096	1	.757	.640	.038	10.718
HL (isiNdebele)	1.958	.869	5.083	1	.024	7.088	1.292	38.903
HL (isiXhosa)	.395	.475	.691	1	.406	1.484	.585	3.766
HL (isiZulu)	.356	.420	.719	1	.396	1.428	.627	3.253
HL (Northern Sotho)	.647	.467	1.922	1	.166	1.910	.765	4.768
HL (Other African)	.393	.809	.236	1	.627	1.482	.303	7.240
HL (Other Foreign)	-2.462	1.133	4.726	1	.030	.085	.009	.785
HL (Sesotho)	.504	.481	1.099	1	.295	1.656	.645	4.250
HL (Setswana)	.751	.469	2.571	1	.109	2.120	.846	5.309
HL (Shona)	.227	.532	.182	1	.669	1.255	.443	3.557

HL (SiSwati)	.267	.594	.203	1	.652	1.307	.408	4.184
HL (Tshivenda)	.517	.557	.863	1	.353	1.677	.563	4.992
HL (Xitsonga)	.462	.562	.675	1	.411	1.587	.527	4.773
ES (Employed)			2.044	4	.728			
ES (FT student)	.158	.295	.286	1	.593	1.171	.657	2.088
ES (Not classified)	-.389	.368	1.116	1	.291	.678	.329	1.395
ES (Unemployed)	-.177	.238	.551	1	.458	.838	.525	1.337
ES (Unknown)	20.32	40192.97	.000	1	1.000	664648391.6	.000	.
Disability (Yes)	-.511	.473	1.166	1	.280	.600	.237	1.517
Workload	-.262	.048	29.705	1	.000	.770	.701	.846
Constant	1.248	.544	5.269	1	.022	3.484		

a. Variable(s) entered on Step 1: Gender, age, ethnicity, home language (HL), employment status (ES), disability status, and workload. FT student = Full-time student.

## 6.7 Summary

Chapter 6 presented a comprehensive account of the results derived from the statistical analyses. Parametric assumptions were explored, all of which were deemed tenable. As such, both descriptive and parametric inferential analyses followed. This study relied primarily on correlations and logistic regressions to answer the research questions.

Results revealed that grit was not a significant indicator of retention from one academic period to the next, nor could it account for additional variance when controlling for previous academic performance. Supplementary results, however, revealed that home language (isiNdebele and other foreign languages) and workload were significant predictors of student retention among postgraduates in an ODL environment.

Chapter 7 provides an overview of the study's aims and methods, a summary of the results and the implications for practice. The limitations and recommendations (for future endeavours) are then highlighted, followed by the concluding remarks.

## **CHAPTER 7: DISCUSSION AND CONCLUSION**

As enrolments in postgraduate programmes continue to rise (CHE, 2018), the importance of retention and the subsequent graduation of these students cannot be overemphasised. While many conventional predictors have been explored within the ODL setting, their limited value prompts the need to seek alternative (novel) indicators. This study examines one such indicator; psychological grit.

The predictive value of psychological grit in determining the retention of honours students in a South African ODL institution has yet to be established. With the aim of narrowing this gap, this chapter presents the salient findings from the statistical analyses, which are then discussed within a higher education context and compared to both seminal and contemporary grit findings. The practical implications inherent in the results are then discussed, followed by the suggested directions for future research. The chapter concludes by highlighting the key contributions of the research study.

### **7.1 The aims, objectives and methods revisited**

This correlational study aimed to explore psychological grit among honours students in a South African ODL context and ascertain its predictive value in determining student retention from one academic period to the next. Secondary to the aim, the current study sought to:

- Investigate the psychometric rigour of the Grit-S scale for use within a South African ODL context;

- Examine the relationship between grit and postgraduate student retention within a South African ODL institution; and
- Assess whether grit could explain incremental predictive validity in student retention rates when controlling for previous academic performance (i.e. matric aggregates and aggregated undergraduate performance).

An online version of the Grit-S instrument was utilised to gauge participants' levels of grit. Thereafter, the one-year lagged secondary data which sought to establish retention status was requested from the University's Registrar. Once collated, relationships between grit and retention were explored using parametric correlation techniques. These analyses were followed by attempts to create logistic equations, regressing retention onto grit, previous academic performance and individual characteristics. In an effort to ensure that the derived results were valid and reliable, the psychometric properties of the online survey (i.e. the Grit-S scale) were first examined.

## **7.2 The validity and reliability of the Grit-S scale among postgraduate students in an ODL environment**

Secondary to the focal aim of the study, this research sought to apply psychometric rigour to the Grit-S scale, taken verbatim, among a sample of postgraduate, distance education students. The factor structure of the scale was both explored and partially confirmed, using exploratory and partial confirmatory factor analyses, sequentially. Thereafter, item analyses were conducted on the identified factors to assess each dimension's reliability.

### 7.2.1 Validity of the Grit-S scale

An EFA was initially conducted to explore the underlying factor structure of the scale, using principal component factoring extraction, with direct oblimin rotation, using eigenvalues greater than 1.00 as the fit criterion (Kaiser, 1974). Results indicated that two distinct factors lay beneath the surface of the scale, producing respective eigenvalues of 2.99 and 1.59. The third and subsequent factors produced eigenvalues below 1.00 and were therefore not retained.

Inspection of the pattern matrix derived from the EFA revealed that the two factors were identical in composition to those suggested by Duckworth et al. (2007). Items 1, 3, 5 and 6 loaded onto factor one (i.e. passion or consistency of interest), while items 2, 4, 7 and 8 loaded onto factor two (i.e. perseverance of effort). Cumulatively, these two factors accounted for 57.2% of the variance in the grit scores.

Supplementary results derived from the PCFA partially confirmed the two-factor model of grit among the current sample. Regardless of the significant implied model chi-square<sup>68</sup>, the NFI, TLI and CFI all revealed a good fitting model (>.950). In addition to these incremental fit indexes, the absolute close-fit indices (i.e. RMSEA = .038; and SRMR = .020) produced values close to zero, indicative of an acceptable level of model fit (Hu & Bentler, 1999). Collectively, findings from the EFA and the PCFA substantiated the two-factor structure proposed by Duckworth and colleagues (2007).

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<sup>68</sup> As mentioned in Chapter 6, this test is highly sensitive to sample size, such that tests involving large samples will generally lead to a rejection of the null hypothesis, even when the factor model is appropriate (Gignac, 2009).

This two-factor model of grit is widely accepted in an array of educational contexts (Arco-tirado, Fernández-martín, & Hoyle, 2018; Arslan, Akin, & Çitemel, 2013; Broghammer, 2017; Christensen & Knezek, 2014; Collaço, 2018; Datu, Valdez, & King, 2016; Duckworth & Quinn, 2009; Li et al., 2016; Meriac et al., 2015; Pate et al., 2017; Reraki et al., 2015; Rojas, 2015; Rojas & Tyler, 2018; Stewart, 2015). In the earliest and perhaps most seminal of these studies, Duckworth and Quinn (2009) showed that the two-factor structure of the Grit-S scale held an acceptable level of model fit among two cohorts of West Point cadets ( $CFI \geq .950$ ,  $RMSEA < .08$ ). Concomitantly, the factor structure was validated by the same authors using a large online sample of adults over 25 years old ( $n = 1,554$ );  $CFI = .96$ ,  $RMSEA = .076$ . Additional results revealed that the two-factor model fit the data significantly better when compared to a single-factor solution, as indicated by a significant chi-square difference,  $\Delta\chi^2(1) = 191.93$ ,  $p < .001$  (Duckworth & Quinn, 2009).

Within a public higher education setting, good levels of fit for the two-factor solution have been reported among both traditional ( $CFI > .98$ ,  $RMSEA < .05$ ) (Pate et al., 2017; Rojas & Tyler, 2018) and non-traditional students in the United States ( $CFI = .98$ ,  $RMSEA = .059$ ) (Meriac et al., 2015). Datu et al. (2016), by similar token, revealed that the two-factor model also holds acceptable levels of fit among Filipino students enrolled in a private HEI ( $CFI = .97$ ,  $TLI = .96$ ,  $RMSEA = .05$ ). In addition to the English version of the Grit-S scale, research emanating from Spain, Turkey, Italy, and Poland has alluded to the two-factor model. Arco-tirado et al. (2018), Arslan et al. (2013), Reraki et al. (2015), Saricam, Celik, and Oguz (2016), Sulla, Renati, Bonfiglio and Rollo (2018), and Wyszynska, Ponikiewska, Karas, Najderska and Rogoza (2017) have shown that *translated* versions<sup>69</sup> of the two-factor model

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<sup>69</sup> Turkish (Arslan et al., 2013; Reraki et al., 2015; Saricam et al., 2016); Spanish (Arco-tirado et al., 2018); Italian (Sulla et al., 2018); and Polish versions (Wyszynska et al., 2017).

also demonstrate acceptable levels of fit among tertiary students ( $CFI \geq .920$ ,  $RMSEA \leq .08$ ,  $SRMR < .08$ ).

While worthy of comparison, particularly due to the shared HE environment, it must be mentioned that the majority of the aforementioned studies sampled undergraduate students attending contact-based HEIs abroad. And, although grit has been examined among postgraduate students (Aswini & Deb, 2017; Burkhart, Tholey, Guinto, Yeo, & Chojnacki, 2014; Kannangara et al., 2018; Palisoc et al., 2017; Salles, Cohen, & Mueller, 2014), distance students (Hwang et al., 2017), and South African students (Mason, 2018; Urban & Richard, 2015), the psychometric analyses in these studies are either non-existent or focus solely on the reliability of the scale. The absence of comparable findings suggests that this study is one of the first to explore and confirm the factor structure of the Grit-S scale, using a sample of South African, postgraduate, ODL students.

### **7.2.2 Reliability of the Grit-S scale**

Having validated the factor structure of the Grit-S scale among the sample, the reliability of the scale was then assessed. Overall, the Grit-S scale demonstrated acceptable reliability among the current sample, producing a Cronbach's alpha coefficient of .72. As for the individual factors, the passion dimension exhibited acceptable reliability ( $\alpha = .77$ ), as did the perseverance subscale ( $\alpha = .62$ ).

Similar findings within the higher education sphere are well-provided. Spanning a decade, grit and its dimensions have shown to be reliable across a range of student populations.

Within an ODL environment, Hwang et al. (2017) revealed that the Grit-O scale<sup>70</sup> demonstrated acceptable levels of reliability among undergraduates in Korea ( $\alpha = .75$ ). Among undergraduates in contact-based institutions in the United States, the Grit-S scale has also demonstrated sound reliability, producing Cronbach's alpha values ranging from .73 to .83 (Akos & Kretchmar, 2017; Duckworth & Quinn, 2009; Luthans, Luthans, & Chaffin, 2018; Rojas & Tyler, 2018).

Reraki et al. (2015) published similar findings among undergraduate students in Turkey, with the overall Grit-S scale generating a Cronbach's alpha of .88. Recently, Arco-tirado et al. (2018) and Sulla et al. (2018) revealed that the Grit-S scale also produced reliable results among undergraduates in Spain ( $\alpha = .75$ ) and Italy ( $\alpha = .76$ ). Within the confines of the South African context, the Grit-S and Grit-O scales have also shown to produce reliable results among undergraduate students (Mason, 2018; Urban & Richard, 2015).

In the most recent of these South African studies, Mason (2018) sampled first-year students enrolled in undergraduate programmes at a university of technology<sup>71</sup>. Results derived from the analyses revealed that the Grit-O exhibited sound reliability ( $\alpha = .81$ ), as did each of the subscales (passion,  $\alpha = .80$ ; perseverance,  $\alpha = .78$ ). The Grit-S scale, by similar measure, demonstrated an acceptable level of reliability among final-year undergraduates enrolled in a traditional university<sup>72</sup> in South Africa, producing a reliability coefficient of .71 (Urban & Richard, 2015).

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<sup>70</sup> Research has indicated that the Grit-S scale yields results that are essentially identical to those that use the Grit-O scale (Duckworth & Quinn, 2009).

<sup>71</sup> Traditional universities offer qualifications from the three-year Bachelor's degree to doctoral level qualifications with a strong focus on postgraduate and research activities. Comprehensive universities offer qualifications from the higher certificate to doctoral levels with some related research activity. Universities of technology offer predominantly undergraduate qualifications with some postgraduate and research activity, all with a strong focus on industrial and technological disciplines (CHE, 2016, p. 91).

<sup>72</sup> See Footnote 71 above.

Notably, there is substantial evidence to support the reliability of the grit scales among various undergraduate cohorts; see Table 36 for a chronological record of the reliability coefficients derived from previous research in the higher education sector.

**Table 36: Reliability coefficients derived from previous research in higher education (2009-2019)**

<b>Year</b>	<b>Study</b>	<b>Sample</b>	<b>Scale</b>	<b>Grit (<math>\alpha</math>)</b>	<b>Passion (<math>\alpha</math>)</b>	<b>Perseverance (<math>\alpha</math>)</b>
2009	Duckworth & Quinn	UG	Grit-S	.83	.79	.78
2013	Arslan, Akin & Çitemel	UG	Grit-S	Not reported	.91	.87
2015	Reraki et al.	UG	Grit-S	.88	Not reported	Not reported
2015	Bowman et al. (Sample 1)	UG	Grit-S	Not reported	.71	.73
2015	Bowman et al. (Sample 2)	UG	Grit-S	Not reported	.70	.75
2015	Urban & Richard	UG <sup>b</sup>	Grit-S	.71	.75	.73
2015	Stewart	UG	Grit-O	.75	.72	.77
2015	Meriac et al.	Not reported	Grit-S	.75	.75	.65
2015	Lucas et al.	UG	Grit-S	.73	Not reported	Not reported
2016	Datu, Valdez & King	UG	Grit-S	Not reported	.61	.61
2016	Hill, Burrow & Bronk	UG	Grit-S	.71	Not reported	Not reported
2017	Lee & Sohn	UG	Grit-O	Not reported	.79	.67
2017	Akos & Kretchmar	UG	Grit-S	.77	.67	.70
2017	Broghammer	UG	Grit-S	.75	.66	.65

<b>Year</b>	<b>Study</b>	<b>Sample</b>	<b>Scale</b>	<b>Grit (<math>\alpha</math>)</b>	<b>Passion (<math>\alpha</math>)</b>	<b>Perseverance (<math>\alpha</math>)</b>
2017	Hwang et al.	UG <sup>a</sup>	Grit-O	.75	.68	.70
2017	Aswini & Deb	PG	Grit-O	.82	.83	.70
2017	Hodge, Wright & Bennett	UG	Grit-S	Not reported	.80	.71
2018	Rojas & Tyler (Sample 1)	UG	Grit-O	.84	.85	.83
2018	Rojas & Tyler (Sample 2)	UG	Grit-O	.84	.86	.82
2018	Luthans, Luthans & Chaffin	UG	Grit-S	.73	Not reported	Not reported
2018	Mason	UG <sup>b</sup>	Grit-O	.81	.80	.78
2018	Sulla et al.	UG	Grit-S	.76	.76	.61
2018	Vela et al.	UG	Grit-S	.73	Not reported	Not reported
2018	Kannangara et al.	UG & PG	Grit-O	.85	Not reported	Not reported
2018	Brooks & Seipel	UG & PG	Grit-S	.71	.61	.63
2018	Collaço	UG & PG	Grit-O	.73	.72	.66
2019	Current study	PG <sup>a b</sup>	Grit-S	.72	.77	.62

UG = Undergraduate; PG = Postgraduate; <sup>a</sup> Distance education sample; <sup>b</sup> South African study

Those studies involving postgraduate students are, however, somewhat lacking in the grit literature. Currently, there are only a couple of studies which have reported reliability coefficients for the scale among postgraduate students, and these remain confined to contact-based settings. Aswini and Deb (2017) indicated that the Grit-O scale (and each dimension) produced reliable results among masters and doctoral students in India ( $n = 101$ ), with Cronbach's alpha values ranging from .70 to .83. Kannangara et al. (2018), by the same token, revealed that the same scale was soundly reliable among a British sample of postgraduates ( $n = 39$ ), exhibiting an overall coefficient of .85.

To date, the absence of psychometric analyses upon which to *directly* compare findings is apparent. Although South African studies have explored certain psychometric properties of the grit scale (Mason, 2018; Urban & Richard, 2015), the research findings are limited to contact-based, undergraduate samples. And while assessed among ODL students (Hwang et al., 2017), the findings relate specifically to the reliability among Korean undergraduate students. Moreover, the original grit scale (i.e. the Grit-O) was employed in the studies by Hwang et al (2017) and Mason (2018), and not the short grit scale (Grit-S) as used in this study.

As such, the current study provides novel insight into how the Grit-S scale and its intraneous dimensions perform among a sample of postgraduate ODL students in South Africa. In accordance with suggested criteria (Hu & Bentler, 1999) and acceptable thresholds (Field, 2009), it seems reasonable to conclude that the Grit-S scale is a valid tool and can reliably measure psychological grit (and its inherent dimensions), not only among UGs and PGs abroad, but also among honours students at a South African distance education institution.

### 7.3 The relationship between grit and postgraduate retention within a South African ODL institution

Contrary to expectation, results from the correlational analysis revealed that psychological grit and retention were not correlated among the current sample of honours students,  $r(835) = .03$ , *ns*. Further scrutiny of the Pearson's  $r$  statistic revealed that grit accounted for less than 1% of the variance in the retention rates.

While studies addressing the relationship between academic *performance* and grit scores are somewhat common in the higher education domain (Bazelais, Lemay, & Doleck, 2016; Beyhan, 2016; Bowman, Miller, Woosley, Maxwell, & Kolze, 2018; Broghammer, 2017; Cross, 2014; Duckworth et al., 2007; Hodge et al., 2017; Luthans et al., 2018; Mason, 2018; Nelson, 2016; Palisoc et al., 2017; Reraki et al., 2015; Rogalski, 2018; Stewart, 2015; Strayhorn, 2013), those which concern themselves with the *retention* of tertiary students are lacking (Credé et al., 2016). To date, only a couple of studies have reported the *correlation* between the two constructs and these remain confined to traditional undergraduate samples (Bowman et al., 2018; Rogalski, 2018).

Bowman et al. (2018) revealed that grit (combined with self-efficacy, time management and self-discipline) negatively, but significantly correlated with retention, from first to second year, among a large cohort of undergraduate students,  $r(10,620) = -.15$ ,  $p < .001$ . However worthy of note, it must be mentioned that Bowman et al. (2018) used a number of non-cognitive attributes collectively to create an overall latent factor (which was subsequently used in the analyses). As such, grit's individual relationship with retention in Bowman et al.'s (2018) study remains speculative, at best.

More akin to the current findings are those reported by Rogalski (2018), who examined the relation between Grit-S scores and retention from one semester to the next, using a fairly large sample of undergraduates enrolled in an open-access community college ( $n = 791$ ). Rogalski (2018) revealed that the grit was not correlated with semester-to-semester retention,  $r(789) = -.00$ ,  $p = .98$ , and was unable to account for any variance in the data.

Considering the substantial lack of empirical evidence, these limited findings make it inappropriate to conclude prematurely that grit is (or is not) related to student *retention*, and whether these findings are similar among different degree levels (for example, undergraduate, master's, doctoral studies, etc.). More research is needed in HEIs, not only to help clarify the relationship between grit and retention (among other degree levels), but also to determine whether the observed variability in relations is a function of sampling error and other artefacts<sup>73</sup> or whether this variability reflects the presence of meaningful moderators<sup>74</sup> (Credé et al., 2016).

#### **7.4 The predictive value of grit in determining postgraduate retention within a South African ODL institution**

Seeking to corroborate the findings from the correlational analysis, two separate binary logistic regressions were performed. The first assessed grit's predictive validity as a stand-alone covariate, followed by the second which controlled for previous academic performance (see Sections 5.7 and 6.5). Results from both of these logistic regressions indicated that grit is *not* a significant predictor of retention, neither in isolation,  $\beta = .11$ , *OR*

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<sup>73</sup> For example, differences in the reliability of the measurement of variables.

<sup>74</sup> A moderator is a third variable that affects the strength and/or direction of the correlation of two variables.

= 1.12,  $p = .33$ ; nor when controlling for previous academic performance,  $\beta = -.10$ ,  $OR = .90$ ,  $p = .66$ .

Counter to these findings, foundational works by Duckworth and colleagues (2007) have suggested that grit is not only predictive of *retention* among West Point cadets, but was able to explain unique variance when controlling for the Whole Candidate Score, WCS<sup>75</sup> (60% of which assesses academic performance). In the first of these studies, Duckworth et al. (2007) revealed that grit predicted retention better than self-control and the WCS ( $n = 1,218$ ;  $\beta = .48$ ,  $OR = 1.62$ ,  $p < .01$ ). Subsequent studies by Duckworth and Quinn (2009) confirmed grit's predictive role in determining retention among West Point cadets ( $n = 1,248$ ;  $\beta = .69$ ,  $OR = 1.99$ ,  $p < .01$ ) and further suggested that it explained incremental validity over and above the WCS.

Aside from the seminal findings by Duckworth and colleagues (2007) (see Section 4.2), the remainder of the higher education literature, albeit limited, *concur*s with the findings revealed in the current study. Broghammer (2017) sought to investigate persistence and *retention* among undergraduates enrolled in a traditional university ( $n = 544$ ). Results from the analysis revealed that grit was not a significant predictor of first semester persistence ( $\beta = .39$ ,  $OR = 1.47$ ,  $p = .25$ ), nor of *retention* to second year ( $\beta = .02$ ,  $OR = 1.02$ ,  $p = .94$ ). Moreover, grit was unable to account for any additional variance in either persistence or retention rates when controlling for pre-collegiate academic factors. Rogalski (2018), who measured *retention* from one semester to the next, was able to corroborate these findings,

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<sup>75</sup> Includes SAT score, high school class rank, Leadership Potential Score, and Physical Aptitude Exam.

reporting identical results among a sample of undergraduates enrolled in an open-access community college ( $n = 791$ ;  $\beta = .02$ ,  $OR = 1.02$ ,  $ns$ ).

***A predictor of retention among West Point cadets but not university students?***

Implicit in the above-mentioned findings, together with those revealed in the current study, is what Schreiner (2017) refers to as *the privilege inherent in grit*. As Schreiner (2017, p. 11) rightly indicates, “grit overlooks the role that systemic privilege plays in people’s lives”. This may explain why grit is predictive of retention in the military but not within HEIs, be it contact-based or ODL. To illustrate, applying to West Point has been noted a long and arduous process that starts in junior year of high school, sometimes earlier (Robinson & Stanger, 2013). Recruits are not only required to have exemplary SAT scores and HSGPAs, be in top physical condition, demonstrate outstanding character, and leadership skills, but are also required to obtain a letter of recommendation from a senator, a member of congress, the vice-president or the president (Powers, 2018; Robinson & Stanger, 2013). Acceptance alone is claimed to be an impressive feat (Robinson & Stanger, 2013).

Indeed, a remarkable accomplishment. But, how many of these West Point military cadets come from disadvantaged or underprivileged backgrounds? According to a report by Watkins and Sherk (n.d., as cited in Dubner, 2008), not many. This report indicated that enlisted military recruits are more likely to come from middle- and upper-class neighbourhoods, with over a quarter reportedly originating from the wealthiest neighbourhoods in the USA. Clearly, as Duckworth (2009, p. 83) notes in her book, “the environment we grow up in really does matter, and it matters a lot”.

This is simply not the situation for the majority of participants recruited in the current study, in Broghammer's (2017) study or in Rogalski's (2018) study. Within the current context, Liebenberg and Van Zyl (2012, p. 4) have indicated that *most* UNISA students "emanate from disadvantaged backgrounds and face deeply-rooted socio-economic challenges". Moreover, in both Broghammer's (2017) and Rogalski's (2018) studies, the samples comprised a fair number of students who received Pell Grants<sup>76</sup>.

And therein lies the privilege inherent in grit – or part of it. Focusing only on those who were accepted into West Point provides a distorted perspective on the importance of grit as an indicator of student retention in higher education. Schreiner (2017) alludes to the fact that paragons of grit are often those who grew up in a privileged environment, one in which emotional and financial support was continually expressed or provided (Duckworth, 2016). On a separate but related note, the same author suggests that the privilege of being able to identify and persevere towards a long-term goal also depends on societal support:

This support is evident in well-equipped schools and better-trained teachers in wealthier neighbourhoods, but it is also evident in the norms that tend to accompany being part of the dominant culture. These norms are so much a part of the cultural fabric that they are invisible and thus represent both social class and white privilege. For example, the narrative of the dominant culture is that of the *American dream* – you can be anything you want to be if you are willing to work hard enough. You can pursue your calling, prepare for any

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<sup>76</sup> A Pell Grant is a U.S. federal government subsidy which provides funding for tertiary students. Pell Grants are distributed to students with financial need, who have not earned their first bachelor's degree, or who are enrolled in certain post-baccalaureate programmes through participating institutions (see <https://studentaid.ed.gov/sa/types/grants-scholarships/pell> for further information).

kind of career, and attend any college if your grades and test scores are high enough. The sky is the limit, and the road to success lies in simply pulling yourself up by your bootstraps. *Of course, that assumes you can afford boots* (Schreiner, 2017, p. 13).

In the face of widespread enthusiasm for grit as a potentially novel predictor of retention, the current study, together with those by Broghammer (2017) and Rogalski (2018), provide sound empirical evidence to support a critical re-evaluation of grit's contribution to understanding student retention, particularly among (previously) under-represented or historically disadvantaged students in either ODL or contact-based settings.

## 7.5 Supplementary analyses

Results from the supplementary analyses revealed that home language [isiNdebele:  $\beta = 1.96$ ,  $OR = 7.09$ ,  $p < .05$ ; and (an)other foreign language:  $\beta = -2.46$ ,  $OR = 0.09$ ,  $p < .05$ ] and workload ( $\beta = -.26$ ,  $OR = 0.77$ ,  $p < .01$ ) were the only significant predictors of retention emanating from the current study. Interestingly, isiNdebele participants were 7.09 times more likely to be retained ( $OR = 7.09$ ; 95% CI = 1.29 – 38.90) when compared to the majority of the sample (who indicated English as their home language). However, despite this  $OR$ 's appeal, the confidence interval (CI)<sup>77</sup> is extremely wide (Higgins & Green, 2019), and so the point estimate of 7.09 should be interpreted with caution. Further information on the true effect of this result is needed.

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<sup>77</sup> A confidence interval (CI) describes the uncertainty inherent in any estimate; the wider the CI the larger the uncertainty (Higgins & Green, 2019).

Results from the supplementary analyses also suggested that participants who spoke (an)other foreign language were 0.09 times less likely to be retained when compared to those who spoke English at home;  $OR = 0.09$ ; 95%  $CI = 0.01 - 0.79$ . Although the size of the  $OR$  is not comparable to the one reported above for isiNdebele speakers, the  $CI$  is also wide - indicative of a large degree of uncertainty. This may be due, in part, to the small sample sizes in each of these home language clusters or the insufficient variability in retention rates, as shown below. Either way, interpretation of both results requires caution.

**Table 37: Cross-tabulation of specific home languages and retention**

	Not retained	Retained	Total
isiNdebele	2	12	14
Other Foreign Language	6	1	7

Although the  $OR$  derived from workload was small (according to the delineations set out by Chen et al., 2010)<sup>78</sup>, the  $CI$  was narrow thereby indicating the effect size fairly precisely (Higgins & Green, 2019). The results suggested that for every unit increase in workload (i.e. increasing workload by one module), students were 0.77 times less likely to be retained in the following academic year (95%  $CI = 0.70 - 0.85$ ). Although weak, the correlation between the two constructs suggested that workload was able to account for 4% of the variance in the retention rates,  $r(835) = -.20$ ,  $p < .01$ .

To date, a fair amount of literature exists to support the current findings on workload and student retention (Ashby, 2004; Barnes & Van Zyl, 2014a; Mouton et al., 2015; Nichols,

<sup>78</sup> According to Chen et al. (2010),  $OR$ s equal to 1, 68, 3.47 and 6.71 are equivalent to Cohen's  $d$  of 0.2 (small), 0.5 (medium) and 0.8 (large), respectively (p. 860).

2010; Sadler & Erasmus, 2005; Tresman, 2016). Barnes and Van Zyl (2014a) revealed that increased workloads were significantly related to a decrease in degree success rate among postgraduate below masters (PGbM)<sup>79</sup> students at UNISA, accounting for 23% of the variance. A similar trend was also observed between workload and success (in terms of the normal examination pass rate), again suggesting that further increases in workload are not associated with any increase in success (Barnes & Van Zyl, 2014a). Among honours students across 14 HEIs in South Africa (UNISA included;  $n = 861$ ), Mouton et al. (2015) revealed that the top three reasons students considered discontinuing their studies were (1) the challenge of coping with work/course load; (2) balancing work and studies; and (3) financial difficulties (see Section 2.2.3).

Related findings have been reported elsewhere. Research conducted by the Open University of the United Kingdom (OUUK) has also suggested that workload affects retention among distance education students (Ashby, 2004; Tresman, 2016). Over half the respondents in Ashby's (2004) study agreed that they spent more time studying than they had anticipated. Leeds et al. (2013), by the same token, indicated that the required workload of online courses affects retention, as did Sánchez-Elvira Paniagua and Simpson (2018).

Killen, Marais and Loedolff (2003) and Martins (2006) have suggested that UNISA students often over-assess their own capacities and often take on more work than they actually have the capacity for. The result of these unrealistic expectations regarding workload and capacity may in some cases result in subsequent withdrawal. On a related note, Prinsloo (2009) has indicated that many UNISA students struggle to balance workload and other

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<sup>79</sup> Comprises honours cohorts and postgraduate certificate/diploma cohorts.

personal/professional demands, which also leads to subsequent withdrawal. Practical implications seeking to address these challenges are presented below.

## **7.6 Practical implications**

Considering the results from the current study, it seems plausible to suggest that UNISA should focus its financial and instructional resources on variables other than grit, those that have stronger relationships with student retention among honours cohorts and can easily be changed via interventions (Credé, 2018), such as workload.

The average workload among the current sample stood at four modules (when rounding to the nearest whole,  $\bar{x} = 4.17$ ). The logistic regression revealed that for every unit increase in workload (i.e. increasing one's workload by one module), the odds of being retained in the following academic period decreased. In light of these findings, it stands to reason that interventions aimed at capping or restricting workload in the honours programmes may yield fruitful benefits, for the student and institution alike.

Similarly, curriculum reviews of the honours programmes at UNISA could be conducted at regular intervals, paying particular attention to student workload issues. Where historical and/or current data indicates that high workload is linked with low retention rates, it is suggested that the curriculum's workload be revisited to ensure that it places realistic demands on honours students, while remaining true to each programmes' learning outcomes (Tresman, 2002, p. 8). Within this context, UNISA's Directorate for Counselling and Career Development (DCCD) may also play a pivotal role in providing additional guidance to honours students on managing workload (Tresman, 2016).

## **7.7 Limitations and recommendations for future directions**

### ***Generalisability***

No research endeavour is without limitation, and this study is no exception. Firstly, with the study restricted only to UNISA honours students, the results cannot be generalised to undergraduate, master's, or doctoral students at UNISA, nor to those attending contact-based HEIs in South Africa. As such, these findings should be interpreted contextually. Widening the sample to other cohorts in UNISA would not only yield interesting data concerning the relationships between grit and retention, but also contribute to the scarce body of grit literature in ODL environments in South Africa.

### ***Self-reported data, social desirability bias and self-selection bias***

Secondly, the current study relied on self-reported data to infer to the broader honours 2017 cohort. Lamentably, as Jaeger, Freeman, Whalen and Payne (2016) note, self-reported data is susceptible to faking or exaggeration by the test takers and social desirability bias, the latter of which concerns itself with a deliberate attempt to respond in such way so as to represent themselves more favourably. On the other hand, selection bias may generally have favoured completion by grittier students ( $\bar{x} = 3.82$ ). Self-selection bias occurs whenever the group of people being studied has any form of control over whether to participate (as current standards of human-subject research ethics require) (Olsen, 2011). With this control, there remains the possibility that respondents' propensity for participating in the study is correlated with the substantive topic at hand, making the participants a non-representative sample (Olsen, 2011).

While surveys are a useful tool to gather information from a large number of participants in a reasonable period of time, there is no way to triangulate the data to ensure accuracy and reduce possible social desirability. Future research might also include other types of measures reported by peers or instructors (lecturers, e-tutors, face-to-face tutors) that could provide more evidence for the presence of grit in students (Rojas, 2015).

### *One-year lagged secondary data*

Thirdly, the timing of data collection could have played a significant role in the findings. Considering the extended time frames inherent in UNISA's qualifications, the one-year lagged secondary data may be considered a relatively short succession<sup>80</sup>. The insufficient lapse in time may not have been adequate to effectively capture the usefulness of grit in predicting what is defined as a long-range goal, such as retention to second year (Broghammer, 2017). It therefore seems plausible to suggest that grit may predict retention to third year or to graduation. However, this is stated tentatively and requires further exploration.

### *Assuming participants' long-term goals*

Another major limitation is that commitment to retention was assumed but not directly measured. As such, retention, as measured in the current study, may not necessarily have been in line with the student's personal or individual goals. It remains possible that students

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<sup>80</sup> Honours students are given three (3) years to complete their respective 120-credit qualifications (see <https://www.unisa.ac.za/sites/corporate/default/Register-to-study-through-Unisa/Undergraduate-&-honours-qualifications/FAQs>). The expected minimum time to completion according to the institution is 1.7 years; see Table 3.

who were not retained held other long-term goals that conflicted with the assumed retention goals. Alternatively, students who were not retained may have stopped out and intend to return to the institution at a later stage. Either way, additional research is needed, which explores grit as an indicator of short-term retention goals as well as long-term success (Eskreis-Winkler et al., 2014).

### ***Aggregated performance data***

Results from the binary logistic regression revealed that grit did not account for any additional variance. Interestingly though, neither the matric- nor the undergraduate aggregates were predictive of retention from one academic period to the next among the current sample of honours students. This limitation may be attributed to the discretisation<sup>81</sup> of these two variables, which resulted in a crude description of the students' previous academic performance. Disaggregated data may yield different results among the sample of interest. However, this is tentatively stated and requires further exploration among the honours cohorts at UNISA.

### ***Single dependent variable***

Finally, the current research project only examined the relationship between grit and *one* student outcome, retention. While not a predictor, the findings revealed in the current study do not negate the fact that grit *may* play a pivotal role in understanding students' *performance* among UNISA students. As such, future research endeavours would benefit

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<sup>81</sup> Discretisation is the process of grouping values into categories so that there are a limited number of possible states.

from an examination of grit's predictive value in ascertaining *performance* in a South African ODL context. Although a couple of studies have alluded to the importance of grit in determining student outcomes in South Africa, these studies remain confined to contact-based HEIs (Mason, 2018; Urban & Richard, 2015). Moreover, considering the fact that UNISA enrolls more than one-third of the students in South African public HEIs, the benefit of conducting such a study could provide substantial insight, not only among those pursuing HE at a distance, but for the South African HE sector as a whole.

## **7.8 Contributions**

This study extends previous literature in at least two ways. Firstly, the current study appears to be the first to explore the *grit-retention* relation in an open, distance learning environment in South Africa. Although similar findings have been reported among traditional and community college students in the United States (Broghammer, 2017; Rogalski, 2018), a review of the distance education literature suggests that this study is the first to disprove the claims put forth by Duckworth and colleagues (2007, 2009), not only within a South African ODL context, but globally.

Secondly, the psychometric rigour of the Grit-S scale was assessed. This, too, appears to be the first within a South African ODL context. Although Hwang et al. (2017) and Meriac et al. (2015) examined the psychometric properties of the scale among distance and non-traditional students, their findings remain confined to Korean and American tertiary settings. Within a South African context, Mason (2018) and Urban and Richard (2015) described the psychometric properties of the grit scale; however, their findings remain contact-bound and restricted to undergraduate samples. Moreover, Mason (2018) and Urban and Richard (2015) failed to explore the factor structure of the grit scale.

As such, it seems plausible to suggest that this study was the first to explore and partially confirm the two-factor structure of grit, not only within a South African ODL environment, but the South African HE sector in general. Particularly worthy of note is that the Grit-S scale exhibits sound construct validity and is likely to produce reliable results among postgraduate students, not only at UNISA, but perhaps amongst other public HEIs in the country as well.

## **7.9 Conclusion**

This study sought to investigate the predictive value of psychological grit in determining the retention of honours students at the University of South Africa (UNISA). In light of the declining retention rates among these students;<sup>82</sup> the limited value of traditional predictors<sup>83</sup> and the multitude of studies which have cited its power to predict retention<sup>84</sup>, the examination of grit as an indicator and as a focus of intervention held much intuitive appeal (Credé et al., 2016). Moreover, its relative absence in distance education settings prompted further appeal.

However, despite the widespread enthusiasm for grit as a novel predictor, the current study revealed that grit was not related to student retention, nor could it significantly predict the odds of being retained in an ODL environment. While results from the analysis alluded to the psychometric robustness of the Grit-S scale, the results from the correlation and regression analyses provide sound empirical evidence to support a critical reappraisal of

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<sup>82</sup> See Chapter 1.

<sup>83</sup> See Chapter 3.

<sup>84</sup> See Chapter 4.

grit's contribution to understanding *retention* among honours students in South African ODL environments.

These results underscore the importance of recognising the challenging socio-economic circumstances faced by UNISA's diverse, largely part-time and disadvantaged student body (Liebenberg & Van Zyl, 2012). It is furthermore important to recognise the fact that, while passion and perseverance undoubtedly play a role in educational outcomes and success stories elsewhere, the financial and social hardships faced by UNISA students do not make provision for the proverbial stance of the *American dream* – not just yet anyway.

And, while there is no doubt that the sample is gritty (according to Duckworth's definition (2007); see Chapter 1), having grit alone does not appear to influence retention in an economic climate where tuition fees and the cost of participating in higher education continue to rise. Rather, cognisance must be taken that these honours students may be the primary breadwinners in their families, and rather than ensuring their registration in the next academic period, it may be necessary to first secure the basic needs of their family, out of necessity rather than luxury. And so, as Kannangara et al. (2018) rightly indicate ...

*... all that glitters is not grit.*

## REFERENCES

- Admur, A., & Banker, E. A. (2011). *Institutional review board: Member handbook* (3rd ed.). London, Jones and Barlett.
- Akos, P., & Kretchmar, J. (2017). Investigating Grit as a Non-Cognitive Predictor of College Success. *The Review of Higher Education*, 40(2), 163–186.  
<https://doi.org/10.1353/rhe.2017.0000>
- Alidou, H., Boly, A., Brock-Utne, B., Diallo, Y. S., Heugh, K., & Wolff, H. E. (2006). *Optimizing Learning and Education in Africa – the Language Factor*. Retrieved from [http://www.adeanet.org/adea/downloadcenter/Ouga/B3\\_1\\_MTBLE\\_en.pdf](http://www.adeanet.org/adea/downloadcenter/Ouga/B3_1_MTBLE_en.pdf)
- Anderson, E. (2006). Retention for Rookies. In *The National Conference on Student Retention*. San Diego.
- Archer, E., Chetty, Y. B., & Prinsloo, P. (2014). Benchmarking the habits and behaviours of successful students: A case study of academic-business collaboration. *International Review of Research in Open and Distance Learning*, 15(1), 62–83.
- Arco-tirado, J. L., Fernández-martín, F. D., & Hoyle, R. H. (2018). Development and Validation of a Spanish Version of the Grit-S Scale. *Frontiers in Psychology*, 9 (February), 1–7. <https://doi.org/10.3389/fpsyg.2018.00096>
- Arslan, S., Akin, A., & Çitemel, N. (2013). The predictive role of grit on metacognition in Turkish university students. *Studia Psychologica*, 55(4), 311–320.  
<https://doi.org/10.21909/sp.2013.04.645>
- Ashby, A. (2004). Monitoring student retention in the Open University: definition, measurement, interpretation and action. *The Journal of Open, Distance and e-Learning*, 19(1), 65–77.

- Astin, A. W. (1984). Student Involvement: A Developmental Theory for Higher Education. *Journal of College Student Development, 40*(5), 518–529.
- Astin, A. W. (1997). How “good” is your institution’s retention rate? *Research in Higher Education, 38*(6), 647–658.
- Aswini, S., & Deb, A. (2017). Flourishing among postgraduate students: The role of resilience, meaningfulness and grit. *Indian Journal of Community Psychology*. Retrieved from <https://www.thefreelibrary.com/Flourishing+among+postgraduate+students%3A+The+role+of+resilience%2C...-a0488193682>
- Baard, F., & Schreiner, B. (1986). *My Spirit Is Not Banned*. Harare, Zimbabwe Publishing House. Retrieved from <https://www.sahistory.org.za/archive/bantu-education-boycott>
- Badat, S. (2010). The Challenges of Transformation in Higher Education and Training Institutions in South Africa. *Development Bank of South Africa*, (April), 1–37. Retrieved from [http://www.ru.ac.za/media/rhodesuniversity/content/vc/documents/The\\_Challenges\\_of\\_Transformation\\_in\\_Higher\\_Education\\_and\\_Training\\_Institutions\\_in\\_South\\_Africa.pdf](http://www.ru.ac.za/media/rhodesuniversity/content/vc/documents/The_Challenges_of_Transformation_in_Higher_Education_and_Training_Institutions_in_South_Africa.pdf)
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>
- Barnes, G., & Van Zyl, D. (2012). *Unisa Cohort Analyses from 2004-2011*. Pretoria, University of South Africa (Unisa).
- Barnes, G., & Van Zyl, D. (2014a). *Recent Trends in Student Workload and the Implications for Success*. Pretoria, University of South Africa (Unisa).
- Barnes, G., & Van Zyl, D. (2014b). *Retention and Throughput Results for the 2007 Undergraduate Cohorts*. Pretoria, University of South Africa (Unisa).

- Barnes, G., & Van Zyl, D. (2016). *Report for the Portfolio: Teaching, Learning, Community Engagement and Student Support*. Pretoria, University of South Africa (Unisa).
- Bateman, B. (2017). Funding for poor students must cover expenses beyond tuition. *EyeWitness News (EWN)*. Retrieved from <http://ewn.co.za/2017/01/24/funding-for-poor-students-must-cover-expenses-beyond-tuition>
- Bazelais, P., Lemay, D. J., & Doleck, T. (2016). How does grit impact college students' academic achievement in science? *European Journal of Science and Mathematics Education* (Vol. 4). Retrieved from <https://files.eric.ed.gov/fulltext/EJ1107756.pdf>
- Bean, J. (1981). The synthesis of a Theoretical Model of Student Attrition. In *The Annual Meeting of the American Educational Research Association*. Los Angeles, United States.
- Bean, J. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal*, 22(1), 35–64.
- Bean, J., & Eaton, S. (2000). A psychological model of college student retention. In *Reworking the student departure puzzle* (pp. 48–61). Nashville, Vanderbilt University Press.
- Bean, J., & Eaton, S. (2001). The psychology underlying successful retention practices. *Journal of College Student Retention*, 3(1), 73–89.
- Bean, J., & Metzner, B. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research*, 55(4), 485–650.
- Behr, A. (1985). The senior certificate examination as a predictor of university success. *South African Journal of Education*, 5(3), 107–112.
- Bernard, R. M., Brauer, A., Abrami, P. C., & Surkes, M. (2004). The development of a questionnaire for predicting online learning achievement. *Distance Education*, 25(1), 31–47. <https://doi.org/10.1080/0158791042000212440>

- Beyhan, Ö. (2016). University Students Grit Level and Grit Achievement Relation. *Social Sciences and Education Research Review*, 2(3), 13–23.
- Bohlmann, C., Chifamba, P., Cliff, A., Dunlop, J., Frith, V., Grant, F., Sebolai, K. (2015). *National Benchmark Tests Project National Report: 2015 Intake cycle*. Cape Town, University of Cape Town.
- Bowman, N. A., Hill, P. L., Denson, N., & Bronkema, R. (2015). Keep on Truckin' or Stay the Course? Exploring Grit Dimensions as Differential Predictors of Educational Achievement, Satisfaction, and Intentions. *Social Psychological and Personality Science*, 6(6), 639–645. <https://doi.org/10.1177/1948550615574300>
- Bowman, N. A., Miller, A., Woosley, S., Maxwell, N. P., & Kolze, M. J. (2018). Understanding the Link Between Noncognitive Attributes and College Retention. *Research in Higher Education*. <https://doi.org/10.1007/s11162-018-9508-0>
- Boyd, D. (2004). The characteristics of successful online students. *New Horizons in Adult Education*, 18(2), 31–39. <https://doi.org/10.1002/nha3.10184>
- Boyer, S., & Sedlacek, W. (1988). Noncognitive predictors of academic success for international students: A longitudinal study. *Journal of College Student Development*, 29(3), 218–223.
- Broghammer, S. M. (2017). *Grit as a predictor of academic success for first-time undergraduate students*. United States, University of Northern Colorado.
- Brooks, J., & DuBois, D. (1995). Individual and environmental predictors of adjustment during the first year of college. *Journal of College Student Development*, 36(4), 347–360.
- Brooks, N. G., & Seipel, S. J. (2018). Grit and the Information Systems Student: A Discipline-Specific Examination of Perseverance and Passion for Long Term Goals. *Information Systems Education Journal*, 16(1), 21–32.

- Bunting, I. (2006). The higher education landscape under apartheid. In *Transformation in Higher Education. Global Pressures and Local Realities in South Africa* (pp. 35–52). Springer, Netherlands. [https://doi.org/10.1007/1-4020-4006-7\\_3](https://doi.org/10.1007/1-4020-4006-7_3)
- Burkhart, R. A., Tholey, R. M., Guinto, D., Yeo, C. J., & Chojnacki, K. A. (2014). Grit: A marker of residents at risk for attrition? *Surgery (United States)*, *155*(6), 1014–1022. <https://doi.org/10.1016/j.surg.2014.01.015>
- Cabrera, A., & Hengstler, D. (1990). The convergence between two theories of college persistence. *Journal of Higher Education*, *63*(2), 143–164.
- Cabrera, A., Nora, A., & Castaneda, M. (1993). College persistence: Structural equations modeling test of an integrated model of student retention. *Journal of Higher Education*, *64*(2), 123–139.
- Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *Chronicle of Higher Education*, *46*(23), A39–A41.
- Chang, W. (2014). *Grit and Academic Performance: Is Being Grittier Better?* (Unpublished doctoral dissertation). Florida, University of Miami.
- Chen, H., Cohen, P., & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics: Simulation and Computation*, *39*(4), 860–864. <https://doi.org/10.1080/03610911003650383>
- Chernick, I., Exstrum, O., & Molosankwe, B. (2016). #FeesMustFall damages bill. *IOL*. Retrieved from <http://www.iol.co.za/news/south-africa/feesmustfall-damages-bill-r300-302-84858-2008936>
- Christensen, R., & Knezek, G. (2014). Comparative Measures of Grit, Tenacity and Perseverance. *International Journal of Learning, Teaching and Educational Research*, *8*(1), 16–30.

- Cochran, J. D., Campbell, S. M., Baker, H. M., & Leeds, E. M. (2014). The Role of Student Characteristics in Predicting Retention in Online Courses. *Research in Higher Education, 55*(1), 27–48.
- Collaço, C. M. (2018). *What do we really know about grit? A multivariate statistical analysis investigation on the construct validity of grit*. San Francisco, University of San Francisco.
- Council on Higher Education. (2000). *Towards a New Higher Education Landscape: Meeting the equity, quality and social development imperatives of South Africa in the 21st century*. Pretoria, Council of Higher Education (CHE).
- Council on Higher Education. (2004). *South African Higher Education in the first decade of democracy*. Pretoria, Council of Higher Education (CHE).
- Council on Higher Education. (2010a). *Access and throughput in South African higher education: Three case studies*. Pretoria, Council of Higher Education (CHE).  
<https://doi.org/10.1080/03075070902771929>
- Council on Higher Education. (2010b). *Higher Education in South Africa*. Pretoria, Council of Higher Education (CHE).
- Council on Higher Education. (2013). *A proposal for undergraduate curriculum reform in South Africa: The case for a flexible curriculum structure*. Pretoria, Council of Higher Education (CHE).
- Council on Higher Education. (2015). *VitalStats: Public Higher Education 2013*. Pretoria, Council of Higher Education (CHE).
- Council on Higher Education. (2016). *South African Higher Education Reviewed: Two decades of Democracy*. Pretoria, Council of Higher Education (CHE).  
<https://doi.org/10.1080/02642060701453288>

- Council on Higher Education. (2018). *Vital Stats: Public Higher Education 2016*. Pretoria, Council of Higher Education (CHE).
- Credé, M. (2018). What Shall We Do About Grit? A Critical Review of What We Know and What We Don't Know. *Educational Researcher*, 47(9).  
<https://doi.org/10.3102/0013189X18801322>
- Credé, M., Tynan, M. C., & Harms, P. D. (2016). Much Ado About Grit: A Meta-Analytic Synthesis of the Grit Literature. *Journal of Personality and Social Psychology*.  
<https://doi.org/10.1037/pspp0000102>
- Creswell, J. W. (2012). *Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (4th ed.). Pearson. <https://doi.org/10.1017/CBO9781107415324.004>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th ed.). California, Sage Publications, Inc.  
<https://doi.org/10.1007/s13398-014-0173-7.2>
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334. <https://doi.org/10.1007/BF02310555>
- Crosling, G., Heagney, M., & Thomas, L. (2009). Improving Student Retention in Higher Education: Improving Teaching and Learning. *Australian Universities' Review*, 51(2), 9–18.
- Crosling, G., Thomas, L., & Heagney, M. (2008). *Improving Student Retention in Higher Education: The Role of Teaching and Learning*. London, Routledge.
- Cross, T. M. (2014). The gritty: Grit and non-traditional doctoral student success. *Journal of Educators Online*, 11(3), 1–31.
- Datu, J. A. D., Valdez, J. P. M., & King, R. B. (2016). Perseverance Counts but Consistency Does Not! Validating the Short Grit Scale in a Collectivist Setting. *Current Psychology*, 35(1), 121–130. <https://doi.org/10.1007/s12144-015-9374-2>

- De Swardt, C. J., & Marx, J. (2013). Improving course success rates at the Honours level by setting minimum marks for the prerequisite undergraduate qualification. *Progressio*, 35(1), 39–53.
- DeCoster, J. (1998). *Overview of Factor Analysis*. Retrieved from <http://www.stat-help.com/notes.html>
- Demetriou, C., & Schmitz-Sciborski, A. (2011). Integration, motivation, strengths and optimism: Retention theories past, present and future. In *Proceedings of the 7th National Symposium on student retention* (pp. 300–312).
- Department of Higher Education and Training. (2012). *Green Paper for Post-school Education and Training*. Pretoria, Department of Higher Education and Training (DHET).
- Department of Higher Education and Training. (2013a). *The Higher Education Qualifications Sub-Framework*. Pretoria, Department of Higher Education and Training (DHET).
- Department of Higher Education and Training. (2013b). *White Paper for Post-school Education and Training: Building an expanded effective and intergrated post-school system*. Pretoria, Department of Higher Education and Training (DHET).
- Department of Higher Education and Training. (2017a). *2000 To 2014 First Time Entering Undergraduate Cohort Studies for Public Higher Education Institutions*. Pretoria, Department of Higher Education and Training (DHET).
- Department of Higher Education and Training. (2017b). *Statistics on Post-School Education and Training in South Africa*. Pretoria, Department of Higher Education and Training (DHET).

- DeShields Jr, O., Kara, A., & Kaynak, E. (2005). Determinants of business student satisfaction and retention in higher education: applying Herzberg's two-factor theory. *International Journal of Educational Management*, 19(2), 128–139.
- DeTure, M. (2004). Cognitive Style and Self-Efficacy: Predicting Student Success in Online Distance Education. *American Journal of Distance Education*, 18(1), 21–38.  
[https://doi.org/10.1207/s15389286ajde1801\\_3](https://doi.org/10.1207/s15389286ajde1801_3)
- Development Bank of Southern Africa. (2008). *Education Roadmap: Focus on Schooling System*. Midrand, Johannesburg.
- DeYoreo, M. (2018). Stratified random sampling. In B. Frey (Ed.), *The SAGE encyclopedia of educational research, measurement, and evaluation*. California, Sage Publications, Inc. doi:10.4135/9781506326139.n671
- Dille, B., & Mezack, M. (1991). Identifying Predictors of High Risk Among Community College Telecourse Students. *American Journal of Distance Education*, 5(1), 24–35.  
<https://doi.org/10.1080/08923649109526729>
- Directorate for Institutional Research. (2015). *Report to council on the five-year performance of the university from 2010 to 2014*. Pretoria, University of South Africa (Unisa).
- Du Plessis, A., Müller, H., & Prinsloo, P. (2005). Determining the profile of the successful first-year accounting student. *South African Journal of Higher Education*.  
<https://doi.org/10.4314/sajhe.v19i4.25656>
- Du Plessis, L., & Gerber, D. (2012). Academic preparedness of students: An exploratory study. *The Journal for Transdisciplinary Research in Southern Africa*, 8(1), 81–94.
- Dubner, S. J. (2008). Who Serves in the Military Today? Retrieved January 25, 2019, from <http://freakonomics.com/2008/09/22/who-serves-in-the-military-today/>
- Duckworth, A. (2016). *Grit: The power of passion and perseverance*. New York, Scribner.

- Duckworth, A., & Gross, J. J. (2014). Self-control and grit: Related but separable determinants of success. *Current Directions in Psychological Science*, 23(5), 319–325. <https://doi.org/10.1177/0963721414541462>
- Duckworth, A., Kirby, T. A., Tsukayama, E., Berstein, H., & Ericsson, K. A. (2011). Deliberate practice spells success: Why grittier competitors triumph at the National Spelling Bee. *Social Psychological and Personality Science*, 2(2), 174–181. <https://doi.org/10.1177/1948550610385872>
- Duckworth, A., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and Passion for Long-Term Goals. *Journal of Personality and Social Psychology*, 92(6), 1087–1101. <https://doi.org/10.1037/0022-3514.92.6.1087>
- Duckworth, A., & Quinn, P. D. (2009). Development and validation of the short Grit Scale (Grit-S). *Journal of Personality Assessment*, 91(2), 166–174. <https://doi.org/10.1080/00223890802634290>
- Dupin-Bryant, P. A. (2004). Pre-entry variables related to retention in online distance education. *American Journal of Distance Education*, 18(4), 199–206.
- Durkheim, E. (1951). Suicide: A study in sociology. *New York Free Press*, 3, 405. <https://doi.org/10.2307/2088294>
- Eiselen, R., & Geyser, H. (2004). Factors distinguishing between achievers and at-risk students: a qualitative and quantitative synthesis. *South African Journal of Higher Education*, 17(2), 118–130.
- Eskreis-Winkler, L., Shulman, E. P., Beal, S. A., & Duckworth, A. (2014). The grit effect: Predicting retention in the military, the workplace, school and marriage. *Frontiers in Psychology*, 5(36), 1–12.

- Etheridge, J. (2015). Students call off protest as part of agreement at Unisa. Retrieved February 1, 2017, from <http://www.news24.com/SouthAfrica/News/Students-call-off-protest-as-part-of-agreement-Unisa-20151010>
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London, Sage Publications Ltd.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). London, Sage Publications Ltd.
- Fike, D. S., & Fike, R. (2008). Predictors of First-Year Student Retention in the Community College. *Community College Review*, 36(2), 68–88.
- Fisher, G. (2011). *Improving throughput in the Engineering Bachelors Degree: Report to the Engineering Council of South Africa*. Toronto, Canada.
- Fjortoft, N. (1995). Predicting Persistence in Distance Learning Programs. In *Mid-Western Educational Research Meeting*.
- Freer-Weiss, D. (2004). Community college freshmen: Last in first out? *Journal of College Student Retention*, 6(2), 137–154.
- Furr, R. M., & Bacharach, V. R. (2014). *Psychometrics: An introduction* (2nd ed.). California, Sage Publications Ltd.
- Galarnyk, M. (2018). Explaining the 68-95-99.7 rule for a Normal Distribution. Retrieved February 20, 2019, from <https://towardsdatascience.com/understanding-the-68-95-99-7-rule-for-a-normal-distribution-b7b7cbf760c2>
- Gignac, G. E. (2009). Partial confirmatory factor analysis: Described and illustrated on the NEO-PI-R. *Journal of Personality Assessment*, 91(1), 40–47. <https://doi.org/10.1080/00223890802484126>
- Goldberg, L. R. (1990). An alternative “Description of Personality”: The Big-Five factor structure. *Journal of Personality and Social Psychology*, 59(6), 1216–1229. <https://doi.org/10.1037/0022-3514.59.6.1216>

- González, E. (2015). Motivation and Retention: A Comparison between Fully Online Students and On-Campus Students Taking Online Courses. *The Online Journal of Distance Education and E-Learning.*, 3(3), 33–48.
- Gorinski, R., & Abernethy, G. (2007). Maori student retention and success: curriculum, pedagogy and relationships. In *Handbook of teacher education* (pp. 229–240). Springer, Netherlands.
- Grebennikov, L., & Skaines, I. (2008). University of Western Sydney students at risk: Profile and opportunities for change. *Journal of Institutional Research*, 14(1), 58–70.
- Hagedorn, L. S. (2005). *How to define retention: A new look at an old problem. Transfer and Retention of Urban Community College Students Project (TRUCCS)*.
- Hartshorne, K. (1992). *Crisis and Challenge: Black Education from 1910-1990*. Cape Town: Oxford University Press. Retrieved from <https://www.worldcat.org/title/crisis-and-challenge-black-education-1910-1990/oclc/26761451>
- Heider, F. (1958). *The psychology of interpersonal relations*. John Wiley & Sons Inc. <https://doi.org/10.1037/10628-000>
- Henning, E., Rensburg, W. Van, & Smit, B. (2004). *Finding your way in qualitative research*. Pretoria, Van Schaik Publishers.
- Higgins, J., & Green, S. (2019). *Cochrane Handbook for Systematic Reviews of Interventions*. *Cochrane Handbook for Systematic Reviews of Interventions*. The Cochrane Collaboration.
- Higher Education Act 101 (1997).
- Hill, P. L., Burrow, A. L., & Bronk, K. C. (2016). Persevering with Positivity and Purpose: An Examination of Purpose, Commitment and Positive Affect as Predictors of Grit. *Journal of Happiness Studies*, 17(1), 257–269. <https://doi.org/10.1007/s10902-014-9593-5>

- Hodge, B., Wright, B., & Bennett, P. (2017). The Role of Grit in Determining Engagement and Academic Outcomes for University Students. *Research in Higher Education*, 59(September), 448–460. <https://doi.org/10.1007/s11162-017-9474-y>
- Holder, B. (2007). An investigation of hope, academics, environment, and motivation as predictors of persistence in higher education online programs. *Internet and Higher Education*, 10(4), 245–260. <https://doi.org/10.1016/j.iheduc.2007.08.002>
- Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods*, 6(1), 53–60. <https://doi.org/10.1037/1082-989X.12.1.58>
- Hosmer, D., & Lemeshow, S. (1989). *Applied logistic regression*. New York, Wiley.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Hwang, M. H., Lim, H. J., & Ha, H. S. (2017). Effects of Grit on the Academic Success of Adult Female Students at Korean Open University. *Psychological Reports*, 003329411773483. <https://doi.org/10.1177/0033294117734834>
- Jaeger, B., Freeman, S., Whalen, R., & Payne, R. (2016). Successful students: Smart or tough? *117th ASEE Annual Conference and Exposition*, (January 2010).
- Jawitz, J. (1995). Performance in first-and second-year engineering at UCT. *South African Journal of Higher Education*, 9(1), 101–108.
- Joo, Y. J., Joung, S., & Sim, W. J. (2011). Structural relationships among internal locus of control, institutional support, flow, and learner persistence in cyber universities. *Computers in Human Behavior*, 27(2), 714–722. <https://doi.org/10.1016/j.chb.2010.09.007>

- Jordaan, Y., Van Heerden, G., & Jordaan, A. C. (2014). A second-best solution to higher education challenges. *South African Journal of Higher Education*, 28(4), 1269–1282.
- Kahn, J. K., Nauta, M. M., Gailbreath, R. D., Tipps, J., & Chartrand, I. M. (2002). The utility of career and personality assessment in predicting academic progress. *The Journal of Career Assessment*, 10(3), 3–23.
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, XX(1), 141–151.
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31–36.
- Kamenetz, A. (2016). MacArthur “Genius” Angela Duckworth Responds To A New Critique Of Grit. Retrieved February 10, 2017, from <http://www.npr.org/sections/ed/2016/05/25/479172868/angela-duckworth-responds-to-a-new-critique-of-grit>
- Kannangara, C. S., Allen, R. E., Waugh, G., Nahar, N., Zahraa, S., Khan, N., ... Carson, J. (2018). All That Glitters Is Not Grit: Three Studies of Grit in University Students. *Frontiers in Psychology*, 9(August), 1–15. <https://doi.org/10.3389/fpsyg.2018.01539>
- Kelley, T. L. (1927). *Interpretation of educational measurements*. New York, World Book Company.
- Kember, D. (1995). *Open learning courses for adults: a model of student progress*. Englewood Cliffs, Educational Technology Publications.
- Kember, D., & Harper, G. (1987). Implications for instruction arising from the relationship between approaches to studying and academic outcomes. *Instructional Science*, 16(1), 35–46.

- Killen, R., De K Marais, A., & Van Z Loedolff, P. (2003). Success and failure in distance education: Perceptions of South African students and lecturers in Business Management. *South African Journal of Higher Education*, 17(2), 147–158. <https://doi.org/10.4314/sajhe.v17i2.25308>
- Kim, J. (2015). Predictors of College Retention and Performance between Regular and Special Admissions. *Journal of Student Affairs Research and Practice*, 52(1), 50–63.
- Kline, R. B. (2011). *Principles and Practices of Structural Equation Modeling (3rd Ed.)*. New York: The Guildford Press.
- Kline, R. B. (2016). *Principles and practice of structural equation* (Fourth). The Guilford Press, New York, NY. <https://doi.org/10.1111/neup.12006>
- Koen, C. (2007). *Postgraduate student retention and success: A South African case study*. HSRC Press.
- Kubheka, T. (2019). VUT management calls urgent meeting following student protests. *EyeWitness News (EWN)*. Retrieved from <https://ewn.co.za/2019/02/11/vut-management-meets-for-urgent-meeting-following-student-protests>
- Lee, S., & Sohn, Y. W. (2017). Effects of grit on academic achievement and career-related attitudes of college students in Korea. *Social Behavior and Personality: An International Journal*, 45(10), 1629–1642. <https://doi.org/10.2224/sbp.6400>
- Lee, Y., & Choi, J. (2011). A review of online course dropout research: Implications for practice and future research. *Educational Technology Research and Development*, 59(5), 593–618. <https://doi.org/10.1007/s11423-010-9177-y>
- Lee, Y., & Choi, J. (2013). A structural equation model of predictors of online learning retention. *Internet and Higher Education*, 16(February), 36–42. <https://doi.org/10.1016/j.iheduc.2012.01.005>

- Leeds, E., Campbell, S., Baker, H., Ali, R., Brawley, D., & Crisp, J. (2013). The impact of student retention strategies: an empirical study. *International Journal of Management in Education*, 7(1/2), 22. <https://doi.org/10.1504/IJMIE.2013.050812>
- Lehohla, P. (2017). *Education Series Volume III: Educational Enrolment and Achievement* (Vol. III). Pretoria, Statistics South Africa (StatsSA).
- Letseka, M. (2009). University drop-out and researching (lifelong) learning and work. In *Learning/Work: Turning Work and Lifelong Learning Inside Out* (pp. 88–105). HSRC Press.
- Letseka, M. (2015). *Open Distance Learning (ODL) in South Africa*. (M. Letseka, Ed.). New York, Nova Science Publishers.
- Letseka, M., Cossier, M., Breier, M., & Visser, M. (2009). *Student retention and graduate destination: Higher education and labour market access and success*. HSRC Press. <https://doi.org/10.1017/CBO9781107415324.004>
- Letseka, M., & Maile, S. (2008). High university drop-out rates: A threat to South Africa's future. HSRC Press. [https://doi.org/978\\_0796922281](https://doi.org/978_0796922281)
- Lewin, T., & Mawoyo, M. (2014). *Student Access and Success: Issues and interventions in South African universities*. Cape Town, The South African Institute for Advancement.
- Lewis, D. (1973). *Counterfactuals*. Cambridge, Harvard University Press.
- Li, J., Zhao, Y., Kong, F., Du, S., Yang, S., & Wang, S. (2016). Psychometric Assessment of the Short Grit Scale Among Chinese Adolescents. *Journal of Psychoeducational Assessment*, (October). <https://doi.org/10.1177/0734282916674858>
- Liebenberg, H., & Van Zyl, D. (2012). *Pilot results: Student Profile Survey*. Pretoria, University of South Africa (Unisa).

- Liebenberg, H., & Van Zyl, D. (2014). *Report: Student Profile Survey 2014*. Pretoria, University of South Africa (Unisa).
- Lim, C. K. (2001). Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners. *American Journal of Distance Education, 15*(2), 41–51. <https://doi.org/10.1080/08923640109527083>
- Lobmeier, J. H. (2012). Nonexperimental Designs. In N. Salkind (Ed.), *Encyclopedia of Research Design* (pp. 1–9). Sage Publications, Inc.
- Longden, B. (2002). Retention rates - renewed interest but whose interest is being served? *Research Papers in Education, 17*(1), 3–29. <https://doi.org/10.1080/02671520110102516>
- Longden, B. (2004). Interpreting student early departure from higher education through the lens of cultural capital. *Tertiary Education and Management, 10*, 121–138.
- Loram, C. T. (1917). *The Education of the South African Native*. Longmans, Green, and Co.
- Lourens, A., & Smit, I. P. J. (2003). Retention: Predicting First-Year Success. *South African Journal of Higher Education, 17*(2), 169–176.
- Lucas, G. M., Gratch, J., Cheng, L., & Marsella, S. (2015). When the going gets tough: Grit predicts costly perseverance. *Journal of Research in Personality, 59*. <https://doi.org/10.1016/j.jrp.2015.08.004>
- Luthans, K. W., Luthans, B. C., & Chaffin, T. D. (2018). Refining Grit in Academic Performance: The Mediation Role of Psychological Capital. *Journal of Management Education, 00*(0). <https://doi.org/10.1177/1052562918804282>
- MacGregor, K. (2009). South Africa: Shocking results from university tests. *University World News - Africa Edition*. Retrieved from <https://www.universityworldnews.com/post.php?story=20090816082047397>

- Mack, L. (2010). The Philosophical Underpinnings of Educational Research. *Polyglossia*, 19, 1–11.
- Martínez-Mesa, J., González-Chica, D. A., Bastos, J. L. J. L., Bonamigo, R. R., & Duquia, R. P. (2014). Sample size: How many participants do I need in my research? *The Journal Brazilian Annals of Dermatology*, 89(4), 609–615. <https://doi.org/10.1590/ABD1806-4841.20143705>
- Martins, J. H. (2006). *Survey among student drop-outs in 2005*. Study commissioned by the College of Economic and Management Sciences. Pretoria, Bureau of Market Research (Unisa)
- Mason, H. D. (2018). Grit and academic performance among first-year university students: A brief report. *Journal of Psychology in Africa*, 28(1), 66–68. <https://doi.org/10.1080/14330237.2017.1409478>
- McKenzie, K., & Schweitzer, R. (2001). Who succeeds at university? Factors predicting academic performance in first-year Australian university students. *Higher Education Research and Development*, 20(1), 21–33.
- Meriac, J. P., Slifka, J. S., & LaBat, L. R. (2015). Work ethic and grit: An examination of empirical redundancy. *Personality and Individual Differences*, 86, 401–405. <https://doi.org/10.1016/j.paid.2015.07.009>
- Ministry of Education. National Plan for Higher Education (2001). Retrieved from <http://www.justice.gov.za/commissions/FeesHET/docs/2001-NationalPlanForHigherEducation.pdf>
- Moodley, P., & Singh, R. J. (2015). Addressing Student Dropout Rates at South African Universities. *Alternation Special Edition*, 17, 91–115.
- Moore, M. G. (1973). Towards a Theory of Independent Learning and Teaching. *The Journal of Higher Education*, 44(9), 661–679. <https://doi.org/10.2307/1980599>

- Moore, M. G. (1997). The Theory of Transactional Distance. In D. Keegan (Ed.), *Handbook of Distance Education*. Routledge. <https://doi.org/10.4324/9780203803738.ch5>
- Moore, N. (2015). *In A Class Of Their Own: The Bantu Education Act (1953) Revisited*. Pretoria, University of Pretoria.
- Morris, L. V., Wu, S. S., & Finnegan, C. L. (2005). Predicting Retention In Online General Education Courses. *American Journal of Distance Education*, 19(1), 23–36. <https://doi.org/10.1207/s15389286ajde1901>
- Morrow, J., & Ackermann, M. (2012). Intention to persist and retention of First-year students: the importance of motivation and sense of belonging. *College Student Journal*, 46(3), 483–492.
- Morrow, W. E. (1990). Aims of Education in South Africa. *International Review of Education*, 36(2), 171–181.
- Morrow, W. E. (1994). Entitlement and achievement in education. *Studies in Philosophy and Education*, 13(1), 33–37.
- Mouton, J., Van Lill, M., Botha, J., Boshoff, N., Valentine, A., Cloete, N., & Sheppard, C. (2015). *A study on the retention, completion and progression rates of South African postgraduate students*. Pretoria, Department of Science and Technology (DST).
- Müller, H., Prinsloo, P., & Du Plessis, A. (2007). Validating the profile of a successful first year accounting student. *Meditari Accountancy Research*. <https://doi.org/10.1108/10222529200700002>
- Murtaugh, P., Burns, L., & Schuster, J. (1999). Predicting the retention of university students. *Research in Higher Education*, 40(3), 355–371.
- National Qualifications Framework Act 67 of 2008 (2008). <https://doi.org/102GOU/B>

- Nekhwevha, F. (1999). No Matter How Long the Night, the Day is Sure to Come: Culture and Educational Transformation in Post-Colonial Namibia and Post-Apartheid South Africa. *International Review of Education*, 45(5/6), 491–506.  
<https://doi.org/10.1023/A:1003883125717>
- Nelson, S. M. (2016). *Grit, student engagement, and academic performance at a historically black community college*. Walden University, Minneapolis.
- Neroni, J., Gijsselaers, H. J. M., Kirschner, P. A., & De Groot, R. H. M. (2015). The Adult Learning Open University Determinants (ALoud) study: Biological and psychological factors associated with learning performance in adult distance education. *British Journal of Educational Technology*, 46(5), 953–960.  
<https://doi.org/10.1111/bjet.12288>
- Ngqakamba, S. (2019). Wits student protest continues as final registration day looms. *News24*. Retrieved from <https://www.news24.com/SouthAfrica/News/wits-student-protest-continues-as-final-registration-day-looms-20190207>
- Nichols, M. (2010). Student perceptions of support services and the influence of targeted interventions on retention in distance education. *Distance Education*, 31(1), 93.
- Oliver, P. (2010). *The student's guide to research ethics* (2nd ed.). Maidenhead, England: McGraw-Hill.
- Olsen, R. (2011). Self-Selection bias. In *Encyclopedia of Survey Research Methods*.
- Osborne, J. W. (2015). What Is Rotating in Exploratory Factor Analysis? *Practical Assessment, Research & Evaluation*, 20(2).
- Ott, M. D., Markewich, T. S., & Ochsner, N. L. (1984). Logit analysis of graduate student retention. *Research in Higher Education*, 21(4), 439–460.
- Ozga, J., & Sukhnandan, L. (1998). Undergraduate non-completion: Developing an explanatory model. *Higher Education Quarterly*, 52(3), 316–333.

- Palisoc, A. J. L., Matsumoto, R. R., Ho, J., Perry, P. J., Tang, T. T., & Ip, E. J. (2017). Relationship Between Grit with Academic Performance and Attainment of Postgraduate Training in Pharmacy Students. *American Journal of Pharmaceutical Education*, *81*(4), 1–10.
- Pantages, T., & Creedon, C. (1978). Studies of college attrition: 1950-1975. *Review of Educational Research*, *48*(1), 49–101.
- Parker, A. (1999). A Study of Variables that Predict Dropout from Distance Education. *International Journal of Educational Technology*, *1*(2), 1–10.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students (Vol. 2)* (1st ed.). Jossey-Bass Publishers.
- Pate, A. N., Payakachat, N., & Harrell, T. K. (2017). Measurement of Grit and Correlation to Student Pharmacist Academic Performance. *American Journal of Pharmaceutical Education*, *81*(6). <https://doi.org/10.5688/ajpe816105>
- Peltier, G., Laden, R., & Matranga, M. (2000). Student persistence in college: A review of research. *Journal of College Student Retention: Research, Theory and Practice*, *1*(4), 357–375.
- Perkins-Gough, D., & Duckworth, A. (2013). The significance of grit. *Educational Leadership*, *71*(1), 14–20.
- Peyper, L. (2016). NSFAS to pay student registration fees. Retrieved February 1, 2017, from <http://www.news24.com/SouthAfrica/News/nsfas-to-pay-student-registration-fees-20161031>
- Phewa, M. (2013). Academic Development Interventions: Do We Know What Our Students Need? *Journal of Modern Education Review*, *3*(8), 625–633.

- Poellhuber, B., Chomienne, M., & Karsenti, T. (2008). The effect of peer collaboration and collaborative learning on self-efficacy and persistence in a learner-paced continuous intake model. *Journal of Distance Education*, 22(3), 41–62.
- Powers, R. (2018). West Point Admission Requirements. Retrieved January 26, 2019, from <https://www.thebalancecareers.com/the-united-states-military-academy-3344741>
- Pretorius, E. J. (2000). Reading and the Unisa student: Is academic performance related to reading ability? *Progressio*, 22(2), 35–48.
- Pretorius, E. J. (2002). Reading ability and academic performance in South Africa: Are we fiddling while Rome is burning? *Language Matters*, 33(1), 169–196. <https://doi.org/10.1080/10228190208566183>
- Prinsloo, P. (2009). *Modelling Throughput at Unisa: The key to the successful implementation of ODL*. Pretoria, University of South Africa (Unisa).
- Reed, J., Pritschet, B. L., & Cutton, D. M. (2012). Grit, conscientiousness, and the transtheoretical model of change for exercise behavior. *Journal of Health Psychology*, 18(5), 612–619. <https://doi.org/10.1177/1359105312451866>
- Reraki, M., Celik, I., & Saricam, H. (2015). Grit as a mediator of the relationship between motivation and academic achievement. *Ozean Journal of Social Science*, 8(1), 19–32.
- Rickinson, B., & Rutherford, D. (1996). Systematic monitoring of the adjustment to university of undergraduates: a strategy for reducing withdrawal rates. *British Journal of Guidance and Counselling*, 24(2), 213–225.
- Rimfeld, K., Kovas, Y., Dale, P. S., & Plomin, R. (2016). True grit and genetics: Predicting academic achievement from personality. *Journal of Personality and Social Psychology*, 111(5), 780–789. <https://doi.org/10.1037/pspp0000089>

- Robbins, S., Oh, I., Le, H., & Button, C. (2009). Intervention effects on college performance and retention as mediated by motivational, emotional, and social control factors: integrated meta-analytic path analyses. *Journal of Applied Psychology, 94*(5), 1163–1184.
- Robertson-Kraft, C., & Duckworth, A. (2014). True Grit: Trait-level Perseverance and Passion for Long-term Goals Predicts Effectiveness and Retention among Novice Teachers. *Teachers College Record, 116*(3), 1–27.
- Robinson, M., & Stanger, M. (2013). Most Impressive Students At West Point. Retrieved January 25, 2019, from <https://www.businessinsider.com/most-impressive-students-at-west-point-2013-10?IR=T>
- Rogalski, K. (2018). *Grit as a predictor of success and persistence for community college students*. Northern Illinois University, Illinois.
- Rojas, J. (2015). *The relationships among creativity, grit, academic motivation and academic success in college students*. University of Kentucky, Kentucky.
- Rojas, J., & Tyler, K. M. (2018). Measuring the Creative Process: A Psychometric Examination of Creative Ideation and Grit. *Creativity Research Journal, 30*(1), 29–40. <https://doi.org/10.1080/10400419.2018.1411546>
- Roos, R. (2012). *Relationship Between First-Year Student Retention, Noncognitive Risk Factors, and Student Advising (Unpublished doctoral dissertation)*. Utah State University, Utah.
- Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied, 80*(1).
- Rovai, A. P. (2003). In search of higher persistence rates in distance education online programs. *Internet and Higher Education, 6*(1), 1–16.

- Sadler, E., & Erasmus, B. J. (2005). The academic success and failure of black chartered accounting graduates in South Africa: A distance education perspective. *Meditari Accountancy Research*, 13(1), 29–50.
- SafeSkill. (n.d.). NQF Level Descriptions. Retrieved July 19, 2019, from <http://safeskill.co.za/nqf-level-descriptions/>
- Salkind, N. (2010). Nonexperimental Designs. In *Encyclopedia of Research Design*. California, Sage Publications, Inc. <https://doi.org/10.4135/9781412961288.n271>
- Salles, A., Cohen, G. L., & Mueller, C. M. (2014). The relationship between grit and resident well-being. *American Journal of Surgery*, 207(2), 251–254. <https://doi.org/10.1016/j.amjsurg.2013.09.006>
- Sánchez-Elvira Paniagua, A., & Simpson, O. (2018). Developing Student Support for Open and Distance Learning: The EMPOWER Project. *Journal of Interactive Media in Education*, 2018(1). <https://doi.org/10.5334/jime.470>
- Sarantakos, S. (2005). *Social Research*. Palgrave Macmillan.
- Saricam, H., Celik, I., & Oguz, A. (2016). Turkish adaptation of the Short Grit Scale (Grit-S): Validity and reliability study. In *The 3rd International Congress on Curriculum and Instruction*. Adana, Turkey.
- Scholtz, D., & Allen-ile, C. (2007). Is the SATAP test an indicator of academic preparedness of first-year university students? *South African Journal of Higher Education*, 21(7), 919–939.
- Schreiner, L. A. (2017). The Privilege of Grit. *About Campus*, 22(5), 11–20. <https://doi.org/10.1002/abc.21303>
- Scott, I., Yeld, N., & Hendry, J. (2007). A case for improving Teaching and Learning in South African Higher Education. *Council on Higher Education: Higher Education Monitor*, 6, 1–98.

- Seale, L. (2018). Students face being left destitute as NSFAS stumbles. *Sunday Independent*. Retrieved from <https://www.iol.co.za/sundayindependent/news/students-face-being-left-destitute-as-nsfas-stumbles-16302204>
- Shin, N. (2003). Transactional presence as a critical predictor of success in distance learning. *Distance Education*, 24(1), 69–86.
- Sicetsha, A. (2019). Student protests: Tensions remain high as negotiations are deadlocked. *The South African*. Retrieved from <https://www.thesouthafrican.com/student-protests-tensions-remain-high-negotiations-deadlocked/>
- Simpson, O. (2006). Predicting student success in open and distance learning. *Open Learning*, 21(2), 125–138.
- Simpson, O. (2008). Motivating learners in open and distance learning: do we need a new theory of learner support? *Open Learning: The Journal of Open, Distance and e-Learning*, 23(3), 159–170. <https://doi.org/10.1080/02680510802419979>
- Simpson, O. (2013). Student retention in distance education: are we failing our students? *Open Learning: The Journal of Open, Distance and e-Learning*, 28(2), 105–119.
- Slonimsky, L., & Shalem, Y. (2006). Pedagogic responsiveness for academic depth. *Journal of Education*, (40), 35–58.
- Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In *Sociological methodology* (pp. 290–312). San Francisco: Jossey-Bass.
- Sommer, M. M. (2013). *Psychosocial factors predicting the adjustment and academic performance of university students (Unpublished doctoral dissertation)*. Pretoria, University of South Africa (Unisa).
- South African Human Rights Commission. (2006). *Report of the Public Hearing on the Right to Basic Education*. Johannesburg.

- Spady, W. G. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1(1), 64–85.
- Spady, W. G. (1971). Dropouts from higher education: Toward an empirical model. *Interchange*, 2, 38–62.
- Stewart, S. B. (2015). *Grit and self-control as predictors of first-year student success*. University of Southern Maine, Maine.
- Strayhorn, T. L. (2013). What Role Does Grit Play in the Academic Success of Black Male Collegians at Predominantly White Institutions? *Journal of African American Studies*, 18(1), 1–10. <https://doi.org/10.1007/s12111-012-9243-0>
- Stumpf, R. (2010). *Higher Education Sub-Sector Analysis*. Pretoria, The World Bank.
- Subotzky, G. (2011). Enhancing Retention and Success in South Africa. *International Higher Education*, 63, 24–26.
- Subotzky, G., & Prinsloo, P. (2011). Turning the tide: a socio-critical model and framework for improving student success in open distance learning at the University of South Africa. *Distance Education*, 32(2), 177–193.
- Sulla, F., Renati, R., Bonfiglio, S., & Rollo, D. (2018). Italian students and the Grit-S: A self-report questionnaire for measuring perseverance and passion for long-term goals. In *2018 IEEE International Symposium on Medical Measurements and Applications (MeMeA)*. IEEE. <https://doi.org/10.1109/MeMeA.2018.8438668>
- Swail, W. (2004). *The art of student retention: A handbook for practioners and administrators*. Austin, Texas: Educational Policy Institute.
- Swanepoel, C., Subotzky, G., van Schoor, A., Pretorius, P., Botha, H., Prinsloo, P., Wilson, H. (2011). *A Framework and Strategy for Enhancing Student Success at Unisa*. Pretoria, University of South Africa (Unisa).

- Szulecka, T. K., Springett, N. R., & De Pauw, K. W. (1987). General health, psychiatric vulnerability and withdrawal from university in first-year undergraduates. *British Journal of Guidance & Counselling*, *15*(1), 82–91.
- Taylor, P. C., & Medina, M. N. D. (2013). Educational research paradigms: from positivism to multiparadigmatic. *Journal of Meaning-Centered Education*, *1*, 1–16.  
<https://doi.org/10.1007/s13398-014-0173-7.2>
- The Higher Education Qualifications Framework, Pub. L. No. 101, Higher Education Act (1997). Retrieved from <http://www.saqa.org.za/docs/pol/2007/not0928.pdf>
- Tinto, V. (1975). Dropout from Higher Education: A Theoretical Synthesis of Recent Research. *Review of Educational Research*, *45*(1), 89–125.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago: University of Chicago Press.
- Tinto, V. (2007). Research and Practice of Student Retention: What Next? *Journal of College Student Retention*, *8*(1), 1–19.
- Tinto, V., & Pusser, B. (2006). *Moving from theory to action: Building a model of institutional action for student success*. National Postsecondary Education Cooperative.
- Tladi, L. S. (2014). *2014 Unisa Dropout Survey*. Pretoria, University of South Africa (Unisa).
- Tloubatla, M., Van Zyl, D., & Barnes, G. (2016). *An institutional profile: Unisa Facts & Figures (HEMIS 2010-2014)*. Pretoria, University of South Africa (Unisa).
- Tresman, S. (2016). Towards a Strategy for Improved Student Retention in Programmes of Open, Distance Education: A Case Study From the Open University UK. *The International Review of Research in Open and Distributed Learning*, *3*(1), 1–11.  
<https://doi.org/10.19173/irrodl.v3i1.75>

- Tross, S. A., Harper, J. P., Osher, L. W., & Kneidinger, L. M. (2000). Not just the usual cast of characteristics: Using personality to predict college performance and retention. *Journal of College Student Development, 41*(3), 323–334.
- Tuli, F. (2011). The Basis of Distinction Between Qualitative and Quantitative Research in Social Science: Reflection on Ontological, Epistemological and Methodological Perspectives. *Ethiopian Journal of Education and Sciences, 6*(1).
- Uba, L. (1997). Educating For Success: A Strategy To Motivate Independent Learners. *College Quarterly, 4*(4).
- University of South Africa. (2011). *UNISA Admission Policy*. Pretoria, University of South Africa (Unisa).
- University of South Africa. (n.d.). *UNISA: At your fingertips*. Retrieved from <https://www.unisa.ac.za/sites/corporate/default/News-&-Media/Publications/Unisa-at-your-fingertips>
- University of South Africa. (2016a). *2016 Annual Report*. Retrieved from [http://www.unisa.ac.za/static/corporate\\_web/Content/News & Media/Publications/docs/10085798\\_UNISA\\_Annual\\_Report\\_2016.pdf](http://www.unisa.ac.za/static/corporate_web/Content/News&Media/Publications/docs/10085798_UNISA_Annual_Report_2016.pdf)
- University of South Africa. (2016b). *UNISA Language Policy*. Pretoria, University of South Africa (Unisa).
- Urban, B., & Richard, P. (2015). Perseverance Among University Students As an Indicator of Entrepreneurial Intent. *South African Journal of Higher Education, 29*(5), 263–278.
- Van der Westhuizen, S. (2014). Postgraduate students' attitudes towards research and their research self-efficacy. *South African Journal of Higher Education, 28*(4), 1414–1432.

- Van Schoor, W. (2010). The assessment of academic preparedness in an ODL institution. *Progressio*, 32(2), 40–51.
- Van Zyl, A. (2010). *The predictive value of pre-entry attributes for student academic performance in the South African context (Unpublished doctoral dissertation)*. University of Johannesburg, Johannesburg.
- Vela, J. C., Smith, W. D., Whittenberg, J. F., Guardiola, R., & Savage, M. (2018). Positive Psychology Factors as Predictors of Latina/o College Students' Psychological Grit. *Journal of Multicultural Counseling and Development*, 46(1), 2–19. <https://doi.org/10.1002/jmcd.12089>
- Von Culin, K. R., Tsukayama, E., & Duckworth, A. (2014). Unpacking grit: Motivational correlates of perseverance and passion for long-term goals. *The Journal of Positive Psychology*, 9(4), 306–312. <https://doi.org/10.1080/17439760.2014.898320>
- Wang, Ying, Peng, H., Huang, R., Hou, Y., & Wang, J. (2008). Characteristics of distance learners: research on relationships of learning motivation, learning strategy, self-efficacy, attribution and learning results. *Open Learning: The Journal of Open, Distance and e-Learning*, 23(1). <https://doi.org/10.1080/02680510701815277>
- Wang, Yuan, & Baker, R. (2018). Grit and Intention: Why Do Learners Complete MOOCs? *International Review of Research in Open and Distributed Learning*, 19(3). <https://doi.org/10.19173/irrodl.v19i3.3393>
- Wolfe, R. N., & Johnson, S. D. (1995). Personality as a Predictor of College Performance. *Educational and Psychological Measurement*, 55(2), 177–185.
- Wolff, A., Zdrahal, Z., Nikolov, A., & Pantucek, M. (2013). Improving retention: Predicting at-risk students by analysing clicking behaviour in a virtual learning environment. *LAK '13 Proceedings of the Third International Conference on Learning Analytics and Knowledge*. <https://doi.org/10.1145/2460296.2460324>

- Wyszyńska, P., Ponikiewska, K., Karaś, D., Najderska, M., & Rogoza, R. (2017). Psychometric Properties of the Polish Version of the Short Grit Scale. *Polish Psychological Bulletin*, 48(2), 229–236. <https://doi.org/10.1515/ppb-2017-0026>
- Yasmin, D. (2013). Application of the classification tree model in predicting learner dropout behaviour in open and distance learning. *Distance Education*, 34(2), 218–231. <https://doi.org/10.1080/01587919.2013.793642>

## APPENDIX A: PERMISSION TO USE THE GRIT-S SCALE

Hi, Kelly,

As detailed here, <http://angeladuckworth.com/research/>, the Grit Scale can only be used for educational or research purposes. It cannot be used for any commercial purpose, nor can it be reproduced in any publication. You are free to use it in your research as long as you follow these guidelines.

We discourage using the scale to evaluate students or employees. As Angela discusses in this [paper](#) and this [Q&A](#) and this [op-ed](#), the scale is not ready for high-stakes assessment; it is ready for research and internal use.

Thanks for all the work you do!

Best,

----- Forwarded message -----

From: **Kelly Anne Young** <[youngkellyanne@gmail.com](mailto:youngkellyanne@gmail.com)>

Date: Thu, Aug 18, 2016 at 4:17 AM

Subject: PhD study in South Africa among Open Distance Learning (ODL) students - Permission to use the Grit-S Scale

To: [duckwort@psych.upenn.edu](mailto:duckwort@psych.upenn.edu)

Good morning, Prof. Duckworth

I trust this email finds you well.

My name is Kelly Anne Young and I am a registered PhD student at the University of South Africa (Unisa) currently busy with the proposal module.

Just a little background - Of South Africa's total tertiary student population, approximately one-third enrol at Unisa every year making it the largest provider of ODL on the African continent (Pityana, 2009). Like all South African higher education institutions, Unisa is plagued by high dropout rates and low success rates (Davis & Venter, 2011). Albeit briefly stated here, it is against this backdrop that there is an interest to explore the concept of psychological grit as a potential predictor of retention among ODL students. In this regard, would it be possible to request permission to utilise the Grit-S scale in my PhD studies?

I am currently working under the guidance of two promoters:

Promoter: Dr. Angelo Fynn (Unisa, Department of Psychology; [fynna@unisa.ac.za](mailto:fynna@unisa.ac.za))

Co-promoter: Dr. Elizabeth Archer (Unisa, Directorate for Institutional Research; [archee@unisa.ac.za](mailto:archee@unisa.ac.za))

Please feel free to contact either myself or any of my promoters should you have any queries.

Kind regards,

Kelly Anne Young

References

Pityana, N. B. (2009). A country report for COL's forum on a decade of ODL in the Commonwealth. In *Commonwealth of Learning workshop* (pp. 1–21). Nigeria.

Davis, A., & Venter, P. (2011). The performance and success of postgraduate business students. *Progressio*, 33(2), 72–90.

## **APPENDIX B: COVER LETTER TO ONLINE SURVEY**

### **An exploration of psychological grit as a predictor of retention in Open Distance Learning (ODL)**

**Ethical clearance #:** PERC-16068  
**Research permission #:** 2017\_RPSC\_006

#### **COVER LETTER TO AN ONLINE SURVEY**

Dear, Prospective participant

You are invited to participate in a survey conducted by Kelly Anne Young under the supervision of Dr. Angelo Fynn, a Senior Lecturer in the Department of Psychology towards a PhD at the University of South Africa.

The survey you have received has been designed to study psychological grit, a recently proposed trait associated with passion and perseverance towards long-term goals, and it's value in predicting retention. You were selected to participate in this survey because you are first-year Honours student at the University of South Africa – the target population for the current study. You will not be eligible to complete the survey if you are registered for non-degree purposes or have registered for your second (or third) year of your Honours studies. By completing this survey, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings.

It is anticipated that the information we gain from this survey will help us better understand retention among ODL students enrolled for an Honours degree. You are, however, under no obligation to complete the survey and you can withdraw from the study prior to submitting the survey. If you choose to participate in this survey it will take up no more than five (5) minutes of

your time. You will not benefit from your participation as an individual, however, it is envisioned that the findings of this study will enable the researcher(s) to obtain a clearer understanding of retention in ODL and potentially predict such behaviour in the future. We do not foresee that you will experience any negative consequences by completing the survey. The researcher(s) undertake to keep any information provided herein confidential, not to let it out of our possession and to report on the findings from the perspective of the participating group and not from the perspective of an individual.

The records will be kept for five (5) years for audit purposes where after it will be permanently destroyed - hard copies will be shredded and electronic versions will be permanently deleted from any storage devices. You will not be reimbursed or receive any incentives for your participation in the survey.

The research was reviewed and approved by Unisa's Research Permission Subcommittee (RPSC) and the Department of Psychology's Ethics Review Committee. The primary researcher, Ms Kelly Young, can be contacted during office hours at 084 018 8703 or [youngkellyanne@gmail.com](mailto:youngkellyanne@gmail.com). The study leader, Dr Angelo Fynn, can be contacted during office hours at 012 429 8211 or [fynna@unisa.ac.za](mailto:fynna@unisa.ac.za). Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the Department of Psychology's Ethics Review Committee; Prof Piet Kruger at 012 429 6235 or [krugep@unisa.ac.za](mailto:krugep@unisa.ac.za). Alternatively, you can report any serious unethical behaviour at the University's Toll Free Hotline 0800 86 96 93.

You are making a decision whether or not to participate by either clicking upon the 'I consent and agree to participate' or 'I do not wish to participate in this study'. You are free to withdraw from the study at any time prior to clicking the 'Send' button.

## **APPENDIX C: INFORMED CONSENT**

### **An exploration of psychological grit as a predictor of retention in Open Distance Learning (ODL)**

**Ethical clearance #: PERC-16068**

**Research permission #: 2017\_RPSC\_006**

#### **INFORMED CONSENT**

**Dear, Prospective participant**

My name is Kelly Anne Young and I am doing research with Dr. Angelo Fynn, a Senior Lecturer in the Department of Psychology towards a PhD at the University of South Africa. We are inviting you to participate in a study entitled 'An exploration of psychological grit as a predictor of student retention in Open Distance Learning (ODL)'.

#### **WHAT IS THE PURPOSE OF THE STUDY?**

I am conducting this research to find out whether psychological grit is a predictor of student retention within the South African ODL context using the University of South Africa as a case.

#### **WHY AM I BEING INVITED TO PARTICIPATE?**

You were selected to participate in this survey because you are first-year Honours student at the University of South Africa. The current study aims to sample approximately 370 first-year Honours students. With the permission from the Department of Psychology's Ethics Review Committee and the Research Permission Subcommittee (RPSC) your information was obtained from Unisa's registration database.

**WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

The study involves the completion of an online questionnaire. The questionnaire consists of eight (8) Likert scale items (rating scale items), ranging from 1 (not at all like me) to 5 (very much like me). Sample items include: "Setbacks don't discourage me," or "I finish whatever I begin". The maximum score is 5 (extremely gritty) and the lowest is 1 (not at all gritty). If you choose to participate in this survey it will take no more than five (5) minutes of your time.

**CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**

Participating in this study is voluntary and you are under no obligation to consent to participation. Furthermore, there is no penalty, loss of benefit for non-participation. You are free to withdraw at any time and without giving a reason. The online questionnaire will ask for your student number; however your student number will be deleted from the dataset once it has been paired with the secondary data. In this way the data will be anonymised. As such, it will not be possible to withdraw once you have submitted your responses. Should you decide to participate, please select the appropriate check box ('I consent and agree to participate') at the bottom of the page.

**WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

It is envisioned that the findings of this study will enable the researcher(s) to obtain a clearer understanding of retention in ODL and potentially predict such behaviour in the future.

**ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

The researcher(s) do not anticipate any negative consequences (physical and/or emotion harm) as a result of completing the survey. This is due in part to the exploratory nature of the study, as opposed to a diagnostic assessment of academic strengths and weaknesses used for placement or access to support programs (e.g., the National Benchmark Test - NBT).

**WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?**

Yes. You have the right to insist that your student number will not be reported anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Although student numbers will be requested, they will be exclusively used to pair the primary data with the secondary data. Upon completion of the pairing, the student numbers will be discarded from any further analyses and will not appear in any data set after that. In this way, the researcher will anonymise the data. The anonymised data may be used for other purposes, such as a report, journal article(s) and/or conference proceedings.

**HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

Data from the questionnaire will be stored electronically on the hard drive of the researcher's computer; on Unisa's UniDrive; and on an external hard drive for back-up purposes; all of which will be password-protected. Only the researcher and research team will have access to the data. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. The data will be kept in electronic format for five (5) years (for auditing purposes); thereafter the data will be destroyed; it will be permanently deleted from the hard drives and any other storage systems using a relevant software programme.

**WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**

You will not be reimbursed or receive any incentives for your participation in the survey.

**HAS THE STUDY RECEIVED ETHICS APPROVAL**

This study has received written approval from the Department of Psychology's Research Ethics Review Committee and the Research Permission Subcommittee (RPSC), Unisa. Copies of the approval letters can be obtained from the researcher.

**HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

If you would like to be informed of the final research findings, please contact Ms Kelly Young on 084 018 8703 or [youngkellyanne@gmail.com](mailto:youngkellyanne@gmail.com). The findings are accessible for six (6) months.

Similarly, should you require any further information or want to contact the researcher about any aspect of this study, please contact Ms Kelly Young on either 084 018 8703 or [youngkellyanne@gmail.com](mailto:youngkellyanne@gmail.com).

Should you have concerns about the way in which the research has been conducted, you may contact Dr Angelo Fynn on 012 429 8211 or [fynna@unisa.ac.za](mailto:fynna@unisa.ac.za). Alternatively, you may contact the research ethics chairperson of the Department of Psychology's Ethics Review Committee, Prof Piet Kruger at 012 429 6235 or [krugep@unisa.ac.za](mailto:krugep@unisa.ac.za) if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

A handwritten signature in black ink, consisting of several overlapping loops and lines, representing the name of the researcher.

Ms Kelly Anne Young

**(ELECTRONIC) CONSENT TO PARTICIPATE IN THIS STUDY**

I, Student #: \_\_\_\_\_, confirm that the person asking my consent to take part in this research has informed me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read and understood the study as explained in the information sheet.

I am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

Participant student number: \_\_\_\_\_

Date: \_\_\_\_\_

Researcher's Name & Surname: Ms Kelly Anne Young

A handwritten signature in black ink, consisting of several overlapping loops and curves, positioned below the researcher's name.

Date: 12th October 2016

**APPENDIX D: ETHICAL CLEARANCE (UNISA: DEPARTMENT OF  
PSYCHOLOGY)**

Ref. No: PERC-16068



**Ethical Clearance for M/D students: Research on human participants**

*The Ethics Committee of the Department of Psychology at Unisa has evaluated this research proposal for a Higher Degree in Psychology in light of appropriate ethical requirements, with special reference to the requirements of the Code of Conduct for Psychologists of the HPCSA and the Unisa Policy on Research Ethics.*

**Student Name:** Kelly Anne Young

**Student no.** 4087-967-4

**Supervisor:** Dr Angelo Fynn

**Affiliation:** Dept. of Psychology, Unisa

**Co-supervisor:** Dr Elizabeth Archer

**Affiliation:** Institutional Research

**Title of project:**

An exploration of psychological grit as a predictor of student retention in Open Distance Learning (ODL).

The proposal was evaluated for adherence to appropriate ethical standards as required by the Psychology Department of Unisa. The application was approved by the Ethics Committee of the Department of Psychology on the understanding that –

- All ethical requirements regarding informed consent, the right to withdraw from the study, the protection of participants' privacy and the confidentiality of the information will be met to the satisfaction of the supervisors;
- Clearance is to be obtained from the universities from which the participants are to be drawn, and all conditions and procedures regarding access to students for research purposes that may be required by these institutions are to be met.

Signed:

**Prof. M Papaikononou**

[For the Ethics Committee ]  
[ Department of Psychology, Unisa

Date: 2016-10-27

***The proposed research may now commence with the proviso that:***

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Psychology Department Ethics Review Committee.*
- 3) An amended application should be submitted if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*
- 4) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

***Please note that research where participants are drawn from Unisa staff, students or data bases requires permission from the Senate Research and Innovation Committee (SENRIC) before the research commences.***

**APPENDIX E: ETHICAL CLEARANCE (UNISA: RESEARCH PERMISSION  
SUB-COMMITTEE)**



**RESEARCH PERMISSION SUB-COMMITTEE (RPSC) OF THE SENATE  
RESEARCH, INNOVATION, POSTGRADUATE DEGREES AND  
COMMERCIALISATION COMMITTEE (SRIPCC)**

25 January 2017

**Decision: Research Permission  
Approval from 24 January 2017  
until 31 March 2018.**

Ref #: 2017\_RPSC\_006  
Ms. Kelly Anne Young  
Student #: 40879674  
Staff #: N/A

**Principal Investigator:**

**Ms. Kelly Anne Young**  
Department of Psychology  
School of Social Sciences  
College of Human Sciences  
UNISA  
youngkellyanne@gmail.com (012) 441-5484/ 084 018 8703

Supervisors: Dr Angelo Fynn  
fynna@unisa.ac.za, (012) 429-8211/ 082 904 6175

Dr Elizabeth Archer  
archee@unisa.ac.za, (012) 429-2035/ 084 305 1321

**A study titled: "An exploration of psychological grit as a predictor of student retention in  
Open Distance Learning (ODL)."**

Your application regarding permission to conduct research involving UNISA data in respect of the above study has been received and was considered by the Research Permission Subcommittee (RPSC) of the UNISA Senate, Research, Innovation, Postgraduate Degrees and Commercialisation Committee (SRIPCC) on 19 January 2017.

It is my pleasure to inform you that permission has been granted for the study. You may:



University of South Africa  
Preller Street, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
www.unisa.ac.za

1. Gain access to the MyLife email addresses of the first year honours students at Unisa through the gatekeeping assistance of ICT in order to send them an online Grit-S survey.
2. Gain access to the student numbers of the students who have proceeded with their studies in order to compare their psychological grit to their status of having proceeded with their studies.

You are requested to submit a report of the study to the Research Permission Subcommittee (RPSC@unisa.ac.za) within 3 months of completion of the study.

The personal information made available to the researcher(s)/gatekeeper(s) will only be used for the advancement of this research project as indicated and for the purpose as described in this permission letter. The researcher(s)/gatekeeper(s) must take all appropriate precautionary measures to protect the personal information given to him/her/them in good faith and it must not be passed on to third parties.

*Note:*

*The reference number **2017\_RPSC\_006** should be clearly indicated on all forms of communication with the intended research participants and the Research Permission Subcommittee.*

We would like to wish you well in your research undertaking.

Kind regards,



pp. Dr Retha Visagie – Manager: Research Integrity

Email: visagr@unisa.ac.za, Tel: (012) 429-2478

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**Prof L Labuschagne – Chairperson: RPSC**

Email: llabus@unisa.ac.za, Tel: (012) 429-6368



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