

**DEPRESSIVE SYMPTOMATOLOGY AND RESILIENCE
PROFILES AMONG UNIVERSITY STUDENTS**

by

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degree

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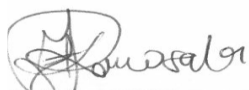
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Abstract

The prevailing increase in suicidal behaviour among university students across the world as well as the increased susceptibility of students to depression warrants the exploration of the mental health landscape found specifically in institutions of higher learning. Although studies have highlighted the potential protective role that resilience plays in the diagnosis of depression, studies which show the association between resilience and depression symptomatology frequently focus on clinical samples, with limited research on the resilience profiles found across depressive symptom severity levels. The aim of the current study was to explore the differences in students' resilience profiles across groups with different depressive symptomatology classifications. The methodology employed was quantitative in nature and a comparative group research design was utilised. The sample of this study comprised of students who participated in a previous study on depression, cognition, temperament, and resilience. Convenience sampling was used in the original study and a total of 135 participants completed assessment protocols. The assessment battery for this study consisted of the Beck Depression Inventory-II, the Predictive 6-Factor Resilience Scale (a measure of resilience from a neurobiological perspective) as well as the Short Raven's Progressive Matrices. Multivariate Analysis of Variance (MANOVA) was utilised for the data analysis. The findings indicated significant group differences in the tenacity and momentum domains as well as in overall resilience. The identified overlap between the neurological underpinnings of resilience as well as the psychosomatic symptoms of depression warrant an integrated approach to the study of depression and resilience. An integrated approach to fostering resilience is warranted within the context of universities, which have student support divisions that are under-resourced and overwhelmed with a higher demand for student mental health services.

Keywords: Depression, symptom severity, resilience, student mental health.

Table of Contents

Declaration of Originality	i
Acknowledgments	ii
Abstract.....	iii
List of Tables	vii
CHAPTER ONE: INTRODUCTION	1
1.1 Introduction	1
1.2 Problem Statement	1
1.3 Research Aim and Question	2
1.4 Objectives of the Study	2
1.5 Overview of Methodology	3
1.6 Significance of Research	3
1.7 Structure of the Dissertation.....	5
CHAPTER TWO: LITERATURE REVIEW.....	6
2.1 Introduction	6
2.2 Student Mental Health.....	6
2.3 Depression.....	8
2.3.1 Depression among university students.....	11
2.4 Resilience	15
2.4.1 Neurobiological resilience	16
2.4.2 The Predictive 6-Factor Resilience Scale (PR6).....	17
2.5 Conclusion.....	19
CHAPTER THREE: METHODOLOGY	21
3.1 Introduction	21

3.2 Research Aim and Objectives	21
3.3 Research Design	21
3.4 Participants	22
3.4.1 Participant recruitment procedure	22
3.4.2 Description of participants	22
3.4.3 Measuring instruments	23
3.4.3.1 Predictive 6-Factor Resilience Scale (PR6).....	23
3.4.3.2 Beck Depression Inventory-2 nd Edition (BDI-II)	23
3.4.3.3 Short Raven’s Progressive Matrices (sRAVEN).	24
3.5 Data Collection Procedure	24
3.5.1 Administration Conditions (Original Study)	25
3.6 Data Analysis	26
3.7 Ethical Consideration	27
3.8 Conclusion.....	27
CHAPTER FOUR: RESULTS	28
4.1 Introduction	28
4.2 Characteristics of Participants	28
4.3 Descriptive Statistics for the BDI-II.....	29
4.4 Descriptive Statistics for the PR6.....	32
4.5 Reliability	33
4.5.1 Internal consistency	33
4.6 Inferential Statistics.....	34
4.6.1 Hypotheses	34
4.6.2 Descriptive statistics of the PR6 scores for the three groups.....	35
4.6.3 Multivariate analysis	37
4.6.3.1 Box’s test of equality of covariance matrices	37

4.6.3.2 Levene’s test of equality of error variances	37
4.6.4 Multivariate Analysis of Variance (MANOVA)	39
4.7 Conclusion.....	43
CHAPTER FIVE: DISCUSSION.....	44
5.1 Introduction	44
5.2 Depression Severity Among University Students	44
5.3 Resilience among University Students.....	47
5.4 Depressive Symptomatology Severity and Resilience Profiles	49
5.5 Prevention and Intervention Strategies for Student Mental Health Services	53
5.6 Summary	56
5.7 Strengths and Limitations of the Study and Recommendation for Future Research	57
5.8 Conclusion.....	58
References.....	60

List of Tables

Table 4.1: Demographic Characteristics of the Total Sample	29
Table 4.2: Frequency of depressive symptomatology	30
Table 4.3: BDI-II Classification of Symptom Severity	31
Table 4.4: Descriptive Statistics of the PR6	33
Table 4.5: Descriptive Statistics of the PR6 Standard Scores	36
Table 4.6: Levene's Test of Equality of Error Variances	38
Table 4.7: Multivariate tests	39
Table 4.8: Tests of Between-Subjects Effects	40
Table 4.9: Pairwise comparison	42

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This study explores the differences in the resilience profiles among university students who present with varying severity levels of depressive symptomatology. This chapter provides an overview of the current research and its background. It further specifies the gaps in literature and poses specific research questions to address this. Additionally, this chapter outlines the aims, objectives, and significance of the research. Lastly, a framework of the research methodology as well as the subsequent chapters of the mini dissertation are provided.

1.2 Problem Statement

The prevailing increase in suicidal behaviour among university students across the world has given rise to the exploration of the mental health landscape found specifically in institutions of higher learning. Furthermore, students are particularly susceptible to depression during the stressful transitioning period from adolescence to adulthood, due to the challenges of balancing new academic and social stressors independent of family and parental support (Gress-Smith et al., 2013).

Research has highlighted that resilience is a potential protective factor in the diagnosis of depression (Min et al., 2013; Poole et al., 2017). However, research which shows the association between resilience and depression symptomatology has frequently focused on clinical samples (Johnson et al., 2010a) and there seems to be limited research on the resilience profiles found across different depressive symptom severity levels.

Jacobs et al.'s (2000) neurobiological theory of clinical depression asserted that stress-induced attenuation in dentate gyrus neurogenesis is an important causal factor in precipitating episodes of depression. The interaction between stress effects, resilience, and the development

of depression was highlighted in a study which found that individuals with greater resilience showed better coping capabilities when confronted with stress-inducing circumstances (Poole et al., 2017). These individuals were consequently less likely to display symptoms of depression than individuals with lower resilience.

Therefore, exploring differences in resilience profiles within the different groups of depressive symptomatology severity is an important consideration when developing efficacious interventions for prodromal depression and progression to clinical stages (Beck et al., 1996; Cameron et al., 2008; Cameron et al., 2011).

1.3 Research Aim and Question

The aim of this exploratory study was to investigate the differences in students' resilience profiles across groups with different depressive symptomatology classifications.

Research question: How do resilience profiles differ as a function of depressive symptom severity in a non-clinical university sample?

1.4 Objectives of the Study

The objectives of the study were as follows:

- To explore resilience dimensions and the severity of depressive symptomatology.
- To investigate the variances in resilience profiles among university students with minimal, mild, and moderate/severe depressive classifications.

1.5 Overview of Methodology

The objectives of the study were achieved through the employment of a comparative group research design. The sample of this study comprised of students who participated in a previous study on depression, cognition, temperament, and resilience. Convenience sampling was used in the original study based on participants' availability and willingness to participate. The sample comprised of students who were registered for the psychology modules at the University of Pretoria. The participants completed an assessment measure for depression (Beck Depression Inventory-2), a measure for resilience (Predictive 6-Factor Resilience Scale) as well as a measure for non-verbal abstract reasoning (Short Raven's Progressive Matrices). Individuals who had previously been diagnosed or treated for any neurological illnesses and mental disorders were excluded from the primary study, as well as those who had used substances in the three months prior to the inception of the study. Multivariate Analysis of Variance (MANOVA) was utilised for the data analysis. Furthermore, a univariate analysis was implemented.

1.6 Significance of Research

Research on student mental health in South Africa and internationally has proliferated due to the increasing prevalence of suicide, decreased graduate turn-outs as well as increasing drop-out rates among university students (Department of Higher Education and Training [DHET], 2018; World Health Organisation [WHO], 2017).

The vulnerability of students to poor mental health, particularly depression, may depend on issues of adjustment (Pillay et al., 2002), their limited access to psycho-education and psychological resources as well as a heightened exposure to stressful and traumatic events such as financial stress and living in violent communities (Bantjes et al., (2016). The

identification of these factors highlights the importance of focusing on mental health among South African university students. South Africa is still considered to be a developing country facing many socio-political issues and restrained health and psychological resources, all of which are factors which place South African students at a higher risk for developing mental health disorders. For example, a study by Peltzer and Pengpid (2015) indicated that demographic and social variables, stressful or traumatic life events, and health risk behaviour are associated with severe depressive symptoms among university students from varying socio-economic brackets.

Research on student mental health risk and protective factors indicated that resilience may potentially improve the diagnosis and prognosis of certain pathologies, in particular depression (Min et al., 2013; Poole et al., 2017). However, these studies which explored the association between resilience and depression symptomatology are limited in their exploration of how resilience profiles manifest differently in subclinical depression and across severity levels.

Furthermore, the conceptualisation of resilience has changed from it being defined and understood as a trait (intrinsic) to it being considered a continuously evolving state (process-oriented) which can be determined or predicted by multiple factors. The factors that are measured consistently (amongst many others) by resilience measures include: one's perception of social support, one's awareness of themselves and others, one's approach to solving problems, and one's outlook on life (Chmitorz et al., 2018; Rossouw & Rossouw, 2016). Resilience has also been associated with various indicators of well-being outcomes such as life satisfaction and finding meaning in life (Musumari et al., 2018). This association between resilience and well-being outcomes is of particular interest for mental health, as these outcomes

seem to be affected in individuals who display depressive symptoms (American Psychiatric Association [APA], 2013; Min et al., 2013).

Therefore, the limited research on resilience profiles among groups with different depressive symptom classification, the established role of resilience as a protective factor against depression, the mental health vulnerability of students, and the overburdened university student support services provide the underlying rationale for conducting this exploratory study.

1.7 Structure of the Dissertation

Chapter Two reviews the background as well as the current literature on depression among the student population and the existent literature on resilience. Chapter Three outlines the methodology utilised throughout the study, focusing on the sampling method, the different measuring instruments that were used as well as the statistical techniques that were used for the analysis of the data. In Chapter Four, a detailed representation of the findings is outlined. Chapter Five focuses on discussing the main findings of the study by situating them within the broader literature. Additionally, the limitations of the study and the recommendations for future research are indicated in Chapter Five.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter includes a review of the current available literature that is relevant to the topic of the study. Firstly, an overview of the current mental health landscape among university students globally and in the South African context is provided. The definition as well as an overview of depression and depressive symptomatology is outlined, specifically the manifestation and the prevalence thereof. Thereafter, the prevalence and manifestations of depressive symptomatology evident specifically among university students are detailed. The conceptualisation of resilience as well as its proposed role as a protective factor are then discussed. Lastly, an overview of the neurobiological factors of resilience will be presented.

2.2 Student Mental Health

Students who are enrolled into university programmes are required to display a certain level of proficiency in the skills that are required for the completion of their programmes of choice. From this it can be inferred that all university students have, to some extent, the potential to succeed academically. However, this inference does not seem to be supported by through-put rates (DHET, 2018). This raises speculations around the factors that allow for some students to persevere and achieve amidst the pressures of the academic environment. Furthermore, it raises concerns for student support divisions in these institutions, whose primary aim is to create an environment for all learners to achieve their academic goals and maintain a balanced sense of health.

A study by Stallman (2010) emphasised the necessity of early interventions within this high-risk group, focusing on the prevention of severe mental illnesses developing over time. Although not all university students get diagnosed with a mental health disorder during their

academic year, it is reported that some students present with prodromal symptoms of a disorder (i.e., the early signs and symptoms of a disorder before the full requirements for a conclusive diagnosis) (Kim et al., 2018). For example, Jiang et al. (2019) reported that in a sample of 2068 university students who took the Center for Epidemiologic Studies Depression Scale (CES-D), approximately 33% presented with prodromal depression. The findings from Australian universities indicated that of the 19.2% of individuals who presented with varying forms of psychological distress, 67.4% of those individuals presented with subsyndromal symptoms; higher than that found in the general population.

However, the results from studies that have been conducted among university students in South Africa indicated that South African students are more at risk of depression than their counterparts internationally (Herman et al., 2009; Joe et al., 2008). Furthermore, it is reported that preventative interventions have been associated with lessening the prevalence of various mental health and related problems among individuals in higher education (Davies et al., 2014; Scott-Sheldon et al., 2014; Yager & O’Dea, 2008). Barry et al. (2013) indicated that both school-based as well as community-based early interventions positively impact youth mental health and social wellbeing.

Studies indicated that the increased prevalence of psychological distress among South African students is due to varying social, political, and economic factors – all which interplay in the country’s unique demographic (Bantjes & Swartz, 2017; Lemmi et al., 2016; Mungai & Bayat, 2019). In their study of factors that predict suicidal ideation among university students, Bantjes et al. (2016) reported that anxiety influenced a significant number (8.1%) of students’ suicidal behaviour and ideations. This is of particular concern when analysed adjacent to South Africa’s increasing rate of suicide among students in institutions of higher learning. Furthermore, psychological stress, perceived social support as well as self-esteem are cited as

vulnerability factors in the prevalence of depression among learners in basic as well as higher education (Chang et al., 2018; Van Den Berg et al., 2010; Strydom et al., 2012). Farrer et al. (2016) suggested that the restricted availability and accessibility to psychological services may be at play in the high prevalence rates that are found in the country. They highlighted that there are limited staff at psychological service providers who are expected to assist large numbers of students who rely on these free services provided by their institutions. Additionally, this is common in public universities as most of the individuals are not able to afford psychological services from private service providers (Farrer et al., 2016; Mungai & Bayat, 2019). Therefore, a burdensome responsibility is assumed by university student support divisions, which are unable to attend timeously to all those in need.

Additionally, studies suggested that factors such as living in violent communities and exposure to traumatic life events further increase the prevalence of psychological distress (Bantjes et al., 2016; Pillai et al., 2009; Sipsma et al., 2013). In their study which detailed the factors that predict suicidal ideation among university students, Bantjes et al. (2016) reported that students who displayed symptoms of depression and who had previous exposure to trauma were more likely to engage in suicidal ideation than those who did not have these symptoms. Therefore, the manifestation of depressive symptomatology and the impact thereof within the student population raises substantial concerns and these findings emphasise the need to explore the mental health of South African university students.

2.3 Depression

For a clinical diagnosis of Major Depressive Disorder (MDD) to be confirmed, the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (APA, 2013) postulates that more than five of the psychological, behavioural, and cognitive symptoms outlined therein need to be present. As such, depression can be understood as a chronic and continuous state of

having feelings of hopelessness, loneliness, depressed mood, fatigue, and a diminished interest or pleasure in activities (APA, 2013; Demeyer et al., 2012). Contrastingly, depressive symptomatology can be understood as the somatic, affective, and cognitive symptoms that are common in depressive disorders, however, in the absence of a confirmed clinical diagnosis of such a disorder (Sadock et al., 2015).

The WHO (2017) estimated that the number of people living with depression has increased by 18.4% between 2005 and 2015. It further estimated that an average of 4.4% of the global population in 2015 was living with depression. Furthermore, the South African Stress and Health Study (SASHS) which was conducted as part of the WHO World Mental Health (WMH) Survey Initiative, reported that the prevalence of depression in South Africa was higher than that of the other southern African countries (such as Nigeria), with an average of 5% of South Africans living with depression (Williams et al., 2008). Additionally, the SASHS study further indicated that of those living with depression, approximately 20% were classified with mild depression, 46% with moderate depression, and 33% with severe depression. Van Zyl et al. (2017) found a similar pattern of severity classification among university students, with the majority reporting moderate symptom severity. Of the identified 5% of individuals living with depression in the SASHS study, 3% were in the age group similar to that of university students (18-34 years old) (Williams et al., 2008). Gress-Smith et al. (2013) corroborated the high prevalence of depression among 18–34-year-olds and estimated that 53% of young adults experience some level of depressive symptoms during college.

Jacobs et al.'s (2000) theory of depression emphasised the importance of neurogenesis (the birth of new neurons), which is prominent in the dentate gyrus of the hippocampal formation. They asserted that this process of neurogenesis plays an important role in the precipitation of and recovery from episodes of depression. They further suggested that one of

the factors that suppresses neurogenesis is stress, indicating that individuals who experience prolonged stress-induced morphological suppression may consequently display prolonged depressive symptomatology that is severe. Davidson and McEwen (2012) further reported that moderate to severe stress seems to have varying effects on neuroplasticity in different parts of the brain. In their study detailing the effects of stress on structural plasticity, they reported that although stress promotes excessive growth in the amygdala, these effects tend to be the opposite in the hippocampus. Additionally, the relationship between stress and depression has also been reported within substance use disorder patients (McHugh et al., 2020), left and right hemisphere post-stroke patients (Laures-Gore & DeFife, 2013), and patients suffering from tension type and migraine headaches (Eskin, Çelik, & Gültekin, 2013).

Self-report measures such as the Beck Depression Inventory assess the symptoms of depression. These symptoms can be classified according to ranges of symptom severity, namely: minimal, mild, moderate, and severe (Beck et al., 1996). Studies indicated that differences in the severity and manifestations of symptoms influence the types of interventions that can be implemented (Bower et al., 2013; IsHak et al., 2011; Pfeiffer et al., 2011). For example, a meta-analysis by Bower et al. (2013) indicated that among patients who displayed moderate to severe depression at baseline, those who were more severely depressed demonstrated larger treatment effects than those who were less severely depressed when presented with high-intensity interventions. However, they further highlighted that these high-intensity interventions demand extensive resources which lead to long waiting lists (Bower et al., 2013).

However, a plethora of studies made use of adult samples consisting of individuals who displayed later-onset depression (Baune et al., 2014). Therefore, knowledge of the prevalence and severity of symptoms in a non-clinical group could inform the type of interventions that

could be implemented by student support centres in order to alleviate the progression to more acute stages (Chmitorz et al., 2018).

2.3.1 Depression among university students

The occurrence of depression within the student population usually co-occurs with other disorders such as adjustment disorders and anxiety disorders due to the increased levels of stress, developmental changes as well as the competitive academic environment (Bantjes et al., 2016; Mungai & Bayat, 2019; Waugh & Grant, 2014). Mungai & Bayat (2019) reported that South African university students who lived in lower socioeconomic neighbourhoods that had increased social dysfunctions (e.g., crime and unemployment) were more vulnerable to depression. Furthermore, a longitudinal study assessing students' depressive symptoms over a two-year period at different intervals suggested that the display of depressive symptoms from some students may have been an indication of adjustment problems rather than depression as the prevalence and severity of their symptoms decreased significantly in the second assessment (Silva et al., 2017).

According to college and university studies, the prevalence of depression within the student population is significantly higher than that of the public (Gress-Smith et al., 2013; Van Zyl et al., 2017; Williams et al., 2008). For example, Stallman (2010) reported higher prevalence for mental health problems among university students compared to the general population. Of the 19,2% of students presenting with anxiety-mood problems, 67% were reported to be presenting with subsyndromal symptoms. Furthermore, psychological distress was further associated with low academic achievement (Stallman, 2010).

A review on mental disorder onset age indicated that the transitional period from late adolescence (basic education) to young adulthood (higher education) is a prominent phase for

onset (Kessler et al., 2007). Kessler et al. (2007) further highlighted that in cases where the onset of a disorder occurs during a transitional period, treatment does not typically occur until several years later and that this may in fact increase the severity-persistence of these disorders. Additionally, Weir et al. (2012) asserted that during the transition from late adolescence (basic education) to young adulthood (higher education), meaningful neurodevelopment is underway, particularly the maturation of the prefrontal cortex, which plays a critical role in higher order cognitive functioning and emotional regulation. Cognitive control and emotional regulation have been associated with resilience (Sisk & Foster, 2004).

Furthermore, studies have focused on the influence of depressive symptomology on some of the overarching mechanisms of the prefrontal cortex (Goldstein et al., 2014). These mechanisms are commonly referred to as the executive functions and they have been identified to play an important role in regulating the neurocognitive processes that are responsible for goal-directed behaviour such as planning for the future, evaluating risks, and breaking out of bad habits (Snyder et al., 2015).

Additionally, studies indicated that processes of executive functioning are compromised in the presence of depression (Doumas et al., 2012; Marazziti et al., 2010). Ajilchi and Nejati (2017) suggested that the seriousness of executive dysfunction in individuals who display depressive symptoms depends upon the severity of their depression. The aforementioned is supported by Baune et al. (2008) who compared the cognitive functioning of patients with current MDD with those who had previous MDD, concluding that although both groups had cognitive impairment, those with current MDD had worse cognitive impairment in all domains. Furthermore, these processes are consistently highlighted in studies which identify and discuss factors such as attention and memory, processing speed as well as decision-making, which impact on the successful performance of students (Doumas et al.,

2012; Marazziti et al., 2010). As such, this raises further speculations regarding the influence of depressive symptomatology severity on students' executive functioning abilities in a university context.

The transitional period from late adolescence to young adulthood is also marked by changes in the source of an individual's sense of self-efficacy as a result of making efforts to develop aspects of their identity, particularly their professional identity (Iskender & Akin, 2010; Kessler et al., 2007). Studies conducted among university and college students indicated that there is a significant relationship between depression, self-efficacy, and academic achievement. These studies highlighted that there is a negative relationship between depression and both of the aforementioned factors (Armstrong & Oomen-Early, 2009; Aryana, 2010; Iskender & Akin, 2010). Similarly, Malhotra (2016) reported a significant and negative correlation between self-efficacy and depression within a non-psychiatric sample, whereby self-efficacy influenced the mood of participants and the occurrence of depressive symptoms.

In the university environment, students are exposed to heightened levels of stress and the pressure to perform satisfactorily (Park & Jang, 2013; Regehr et al., 2013). Liu and Alloy (2010) further indicated that there is a complex and reciprocal relationship between stress and depression, with evidence that there is a positive relationship between accumulative stress exposure and the duration and severity of depressive states and symptomatology. As such, it can be inferred that students with a previous history of stress exposure may present with more severe and prolonged depressive states and cognitive dysfunctions, which may influence their academic performance. Wilks and Spivey (2010) further indicated that academic stress has a significantly negative influence on resilience. However, Ozsaban et al. (2017) reported no significant influence or correlation between academic stress and resilience among nursing students despite the high stress levels that were reported within this sample of nursing students.

Therefore, the type of coping strategies that students engage in influences the duration of their stressed state and consequently the duration and severity of their depressive symptomatology. Van Zyl et al. (2017) indicated that students high in traits such as conscientiousness may engage in heightened self-criticism when required to cope in high-stress situations such as university environments. Furthermore, studies indicated that high conscientiousness enhances the protective impact of resilience (Ramasubramanian, 2017; Rossouw & Rossouw, 2016). Individuals who engage in problem-solving or coping techniques that involve conscientiousness may be more resilient and less prone to develop depressive symptoms when dealing with stressful environments and adverse events.

Studies indicated that perceived social support plays a moderating role on the effects of stress on depression (Park & Jang, 2013; Wang, Cai et al., 2014;) as well as resilience (Wilk & Spivey, 2010). This is consistent with studies which reported that deficits in social support are related to varying psychological problems including depression (Yasin & Dzul kifli, 2010). Furthermore, studies suggested that social support has a significant impact on students' academic achievement. Students who perceive their relationships with their family and friends as supportive are reported to have a more positive appraisal of stress as they feel that they do not have to carry the burden alone (Yang et al., 2014; Yasin & Dzul kifli, 2010).

The above-mentioned factors (such as one's coping style, reasoning ability, and appraisal of social support) were found to overlap with and enhance resilience (Zimmerman et al., 2013). This is particularly interesting because it has been reported that facets of resilience may underlie potential transitions from prodromal depression to more acute depression. For example, the physiological health hygiene dimension of resilience and its association with brain-derived neurotrophic factor (BDNF) levels identified by Rossouw and Rossouw (2016) was found to be a common symptom in the prodromal depressive stage, along with fatigue and

impaired work (Fava & Tossani, 2007). Therefore, exploring these differences in resilience profiles may highlight the protective resilience factors that buffer against increasing depressive symptom severity and persistence.

2.4 Resilience

The concept of resilience is theoretically conceptualised and applied differently across various contexts (Ungar & Liebenberg, 2009). The scientific study of resilience can be encapsulated by four waves of research. It began in studies of risk experiences in children conducted in the early 1970s, after it became apparent that those groups of children who were identified to be at risk of developing serious psychopathology showed signs of positive adaptation. Consequently, the first wave of research focused on describing resilience as well as identifying individual factors such as personality, intelligence, and health that were associated with later resilience (Masten et al., 1990). Thereafter, the second wave of research adopted a developmental systems approach to resilience, focusing on how the interactions between the individual and the many systems in which their development is embedded and integrated contributes to their positive adaptation. This wave emphasised that resilience is a phenomenon that arises from processes. After noting the influence of naturally occurring resilience on positive adaptation, the third wave of research began to contemplate actions and efforts that created and promoted resilience, where it did not occur naturally (Coie et al., 1993; Cowen & Durlak, 2000; Masten et al., 1990; Rappaport et al., 2000). The fourth wave in resilience research asserted that resilience is influenced by multilevel dynamics and processes, linking genes, neurobiological adaptation, brain development, behaviour, and context at multiple levels (Theron & Theron, 2010).

Studies have indicated that resilience may play a protective role against depression onset (Loh et al., 2014; Wang, Zhang et al., 2020). Furthermore, it has been associated with

promoting coping strategies and adaptability among individuals in high-risk groups (Masten et al., 1990). Additionally, resilience has also been associated with the positive appraisal of stressful situations as it influences one's thought patterns and problem-solving abilities (Chmitorz et al., 2018; Rossouw & Rossouw, 2016; Shaw, 2016). This highlights the influence that resilience factors have on some of the cognitive functions that may be compromised in depression. Furthermore, the promotion of resilience in early interventions of psychological distress has been associated with reduced symptomatology.

The evolution of the conceptualisation of resilience from being an intrinsic trait to being understood as a dynamic modifiable state and process has consequently led to the development of resilience measures that have shifted from explaining context-specific patterns of behaviour (Martin & Marsh, 2006), to exploring multidimensional characteristics of resilience. Some of these multidimensional characteristics include personal competence, hardiness, approaches to problem-solving, secure relationships and, more recently, health factors such as sleep hygiene, nutrition, and exercise (Connor & Davidson, 2003; Rossouw & Rossouw, 2016).

2.4.1 Neurobiological resilience

Recent resilience studies suggested that resilience has a neurobiological underpinning in the brain's ever-changing neural networks. This implies that resilience does not only help individuals adapt to stressful and traumatic life events but that resilience itself adapts over time (Windle et al., 2008). The adaptive capacity of resilience is considered to emerge from processes of neuroplasticity that influence general coping patterns (Rossouw, 2015). From the exploration of the neurobiological underpinnings of resilience, Rossouw and Rossouw (2016) asserted that physiological health hygiene factors such as sleep, nutrition and exercise correlate with the construct of resilience. This facet of resilience is relevant to and overlaps with the somatic and cognitive features observed in depressive individuals. Individuals with depression

appear to have lower activation at serotonin synapses (Johnson et al., 2010b). An increase in health resilience may potentially increase serotonin levels and, hence, the rate of dentate gyrus neurogenesis, which has been shown to have an indirect protective role against developing depression (Jacobs et al., 2000).

A systematic review of resilience frameworks indicated that factors such as self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-taking and inhibition are all involved in one's resilience (Chmitorz et al., 2018). This is supported by Rossouw and Rossouw (2016) who argued that neurologically, resilience is influenced by many of the functions that are controlled by the prefrontal cortex. Rossouw's (2015) conceptualisation of resilience emerged from the understanding that stress presents itself across different contexts and in varying levels; biological, emotional, psychological, social and spiritual. Rossouw (2015) emphasised the role of the amygdala in the development of resilience, indicating that experiences of distress are recorded by the amygdala as an early warning system in order to act as protection for future risk. He further indicated that this resulted in stronger connectivity and activation in the hypothalamus-pituitary-adrenal (HPA) system, which is known as the stress response system (Rossouw, 2015; Rossouw & Rossouw, 2016). Additionally, activation in the hippocampus has been proven to play a significant role in the regulation of the stress response system, whereby effective hippocampal activation ensures the effective management of environmental stressors. It is for this reason that a neurobiological conceptualisation of resilience has been proposed (Rossouw, 2015; Rossouw & Rossouw, 2016).

2.4.2 The Predictive 6-Factor Resilience Scale (PR6)

Studies indicated that some of the factors that maximise hippocampal wellness include quality sleep, exercise, and nutrition (Bunketorp Käll et al., 2015; Del Olmo, & Ruiz-Gayo,

2018; Déry et al., 2013). The Predictive 6-Factor Resilience Scale (PR6) includes a health-hygiene domain, based on sleep, exercise and nutrition as factors which have a strong interplay with brain-derived neurotrophic factor (BDNF) levels (Rossouw & Rossouw, 2016). Studies have indicated the role played by BDNF in elevating neural production that strengthens healthy approach patterns and, in turn, resilience (Castren & Rantamaki, 2010; Lu, Nagappan, Guan, Nathan, & Wren, 2013). As the sleep, nutrition and exercise factors of resilience overlap with the somatic and cognitive features observed in depressive individuals, it can be inferred that individuals presenting with more severe depressive symptomatology would have lower scores on the PR6 health domain of resilience. Hjemdal et al. (2011) indicated that fewer depressive symptoms were associated with high resilience in young adolescents. Additionally, in a study about depressive symptomatology in late adulthood, Mehta et al. (2007) indicated that low resilience scores were associated with increased depressive symptoms.

A neuroscientific framework, from which the PR6 is derived, emphasises the dynamic nature of neurologically overlapping traits, sharing common underlying anatomical substrates, within the overall construct of psychological resilience (Rossouw & Rossouw, 2016). For example, the vision domain is based on the concept of goal setting which neurologically involves the role of the ventral striatum in higher order decision making (Davidson & Begley, 2012). The interplay of memory storage and retrieval by the hippocampus helps to maintain a hopeful sense of the future and is further reinforced by goal directedness (Preston & Eichenbaum, 2013). The composure domain is based on emotional regulation which is neurologically related to the effective regulation of the HPA. The tenacity and reasoning domains are based on the consistently cited factors of resilience such as hardiness and problem-solving, respectively (Rossouw & Rossouw, 2016).

Resilience studies that were conducted specifically within South African populations asserted that the protective factors of resilience are anchored in the individual and the community, embedded in families and facilitated by culture (Theron & Theron, 2010). Students who come from families that provide them with enough security to promote their self-actualisation are more likely to have heightened resilience than those who do not come from supportive families. Additionally, community resources such as schools play a role in promoting resilience (Musumari et al., 2018; Theron & Theron, 2010). This is evident in studies that found students who attend institutions that have support structures in place are more likely to have reduced mental health problems due to the role that such structures play in facilitating resilience (Ahmed & Julius, 2015).

2.5 Conclusion

Studies have reported decreased university output rates, despite the potential that students have to succeed academically (DHET, 2018). These output rates suggest that there are additional factors that influence students' ability to succeed academically. Furthermore, studies conducted by the World Health Organisation as well as the South African Stress and Health Survey highlighted the increased prevalence of depression among the university student population (Bantjes & Swartz, 2017; Lemmi et al., 2016; Mungai & Bayat, 2019; Williams et al., 2008).

Jacobs et al. (2000) emphasised the importance of neurogenesis in the precipitation of, and recovery from, episodes of depression. Additionally, they highlighted the role that stress plays in suppressing neurogenesis. Furthermore, studies indicate that differences in the severity and manifestations of symptoms influences the types of intervention that can be implemented (Bower et al., 2013; IsHak et al., 2011; Pfeiffer et al., 2011). A neurobiological understanding of resilience asserts that resilience does not only help individuals adapt to stressful and

traumatic life events but that resilience itself adapts over time (Windle et al., 2008). Furthermore, facets of resilience may underlie potential transitions from prodromal depression to acute depression. Therefore, exploring the differences in resilience profiles may highlight the distinct resilience factors in each group and inform further research on interventions focused on resilience and depression severity and progression. Chapter Three details the research methodology.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

Chapter Three provides a description of the methodology which was used in the primary study and how it fits into the current study. The chapter begins by presenting the aims and the objectives of the study. Thereafter, a description of the research design which was used in the primary study is provided. Additionally, an account of the recruitment process is provided, followed by a description of the participants who were in the primary study. Thereafter, a description of the measuring instruments which were used to collect data will be provided. Furthermore, the data collection procedure is detailed as well as the administration conditions which were followed. Lastly, the ethical considerations of the study are discussed.

3.2 Research Aim and Objectives

The aim of this study was to explore the differences in students' resilience profiles across groups with different depressive symptomatology classifications.

The objectives of the study were as follows:

- To explore resilience dimensions and the severity of depressive symptomatology.
- To investigate the variances in resilience profiles among university students with minimal, mild and moderate/severe depressive classifications.

3.3 Research Design

The methodology employed was quantitative in nature and a comparative group design was used. A comparative group design allows the researcher to compare how variables interact across different groups (Mangal & Mangal, 2013). In the study, all participants were

administered the different measuring tools and the participants were divided into three groups based on the depression scores obtained from the Beck Depression Inventory- II.

Depression scores were classified according to the Beck et al. (1996) system and individuals were categorised according to the following severity levels: minimal, mild, moderate/severe. The cut-off scores are 0-13 for the minimal range, 14-19 for the mild range and 20-63 for the moderate/severe range.

3.4 Participants

3.4.1 Participant recruitment procedure

The participants of this study comprised of students who participated in a previous study on depression, cognition, temperament, and resilience. Convenience sampling was used in the original study, based on participants' availability and willingness to participate.

The following exclusion criteria were employed in the primary study:

- Diagnosis and treatment of any mental disorders such as major depressive disorder, schizophrenia, bipolar disorder, etc.
- Other medical or neurological illnesses that may influence performance on assessments, such as history of stroke, epilepsy or brain injury with loss of consciousness.
- Substance abuse within the past three months.

3.4.2 Description of participants

The sample comprised students between the ages of 18 and 25 years of age. Students registered for the psychology modules at the University of Pretoria were recruited to participate in the study on a voluntary basis. A final sample of 135 students was realised.

3.4.3 Measuring instruments

3.4.3.1 Predictive 6-Factor Resilience Scale (PR6).

The PR6 measures psychological resilience from a neurobiological perspective and aims to identify protective factors that may diminish risk and adversity (Rossouw & Rossouw, 2016). This assessment taps into the domains of vision, composure, tenacity, reasoning, collaboration, and health. A momentum factor is also measured which measures one's approach, direction, and openness to new challenges. The PR6 consists of 16 items. Each domain is scored separately to provide domain profiles, and a score is also computed to provide an overall resilience score which ranges from 0 (lowest resilience) to 1 (highest resilience). The PR6 shows good internal consistency with a Cronbach's α of 0.74 (Rossouw & Rossouw, 2016). For the purpose of this study the total score as well as domain scores will be used. The total score is derived from the average score across all domains and it determines overall resilience. The items are rated on a 5-point Likert scale, ranging from 1=not at all like me to 5=very much like me. Ten items are positively scored while 6 items are reverse scored. This instrument has not been previously utilised in a South African context.

3.4.3.2 Beck Depression Inventory-2nd Edition (BDI-II)

The BDI-II is used to identify the presence of state-based depressive symptomatology (Beck et al., 1996). The BDI-II is a self-report, 21-item instrument. Each item is scored on a four-point continuum with a total computed score of 63. Additionally, the BDI-II consists of two subscales, namely the cognitive-affective subscale and the somatic-performance subscale (Beck et al., 1996). Higher scores on the BDI-II indicate greater depressive severity. The BDI-II has been validated and normed for use in South Africa and is considered reliable for use in this context (Makhubela & Mashegoane, 2016). The BDI-II is reported to show good internal

consistency with a Cronbach's α of 0.84 in a South African student population (Makhubela, 2015).

3.4.3.3 Short Raven's Progressive Matrices (sRAVEN).

The sRAVEN is a subtest of the University of Pennsylvania Computerised Neuropsychological Test Battery (PennCNP) which measures abstract reasoning as well as mental flexibility (Gur et al., 2010). It consists of nine multiple choice questions where participants are required to click on the patterns which they believe to best fit with the visual analogy of the nonrepresentational designs that are presented on the page. Scores are based on the number of correct responses as well as the median reaction times for the number of correct, incorrect and all responses. The sRAVEN has been previously administered to South African university students (Murphy & Cassimjee, 2013). This data will be analysed for the purpose of estimating the differences in fluid intelligence among the groups. Both depression and resilience have cognitive substrates and the determination of these differences will enable a better understanding of resilience and depression severity without the confounding element of group differences in fluid intelligence

3.5 Data Collection Procedure

No new data were collected for this study as sections of the data from the original study on depression, cognition, temperament, and resilience were utilised. Data for the original study was collected at the University of Pretoria's physiological laboratory in 2018.

The process followed in the original study was as follows: After approval from the Research Committee of the Department of Psychology and the Faculty of Humanities Postgraduate Research and Ethics Committee at the University of Pretoria, module coordinators were approached by the researchers to obtain permission for a detailed

information sheet to be uploaded on the university ClickUp system (intranet) in order to recruit volunteer participants. The information sheet provided a brief description of the research together with a detailed description of what participation would entail.

Students who were interested, willing to participate and felt that they met the inclusion criteria contacted the researchers via e-mail or SMS. Any questions regarding the research were addressed. Potential participants who were comfortable with the assessment process were then provided with possible time slots in which assessments would take place. Each participant could choose a single time slot. Based on mutual availability a time slot was booked and a reminder with venue information was sent to volunteer participants closer to the date of assessment. Assessment would then proceed as described below. In instances where participants were interested to partake but could not attend one of the given time slots, weekly timetables were sent in order to find a date that would suit both parties.

3.5.1 Administration Conditions (Original Study)

The researchers facilitated all sessions. Group sessions comprised between three and 10 students. The online testing was conducted in a computer laboratory on campus, in a room conducive to optimal testing conditions, i.e. free of distractions and with standardised testing protocols applied to all groups. Online assessments were conducted on desktop computers that were linked to the University of Pennsylvania Computerised Neuropsychological Test Battery (PennCNP). Students were provided with unique identifiers (numerical codes) that were used to log in to the online assessments. This ensured the confidentiality of test scores. Information provided in the socio-demographic questionnaire was reviewed and clarified at the start of each session in order to ensure that participants met the criteria for participation. Following the completion of the online battery (Neuropsychological section and Temperament and Character

Inventory-revised), participants completed the BDI-II and the PR6. The complete assessment battery took 45 – 60 minutes to administer depending on the pace of the participant.

For the current study, the researcher conceptualised the parameters of the investigation based on a larger data set. Furthermore, the researcher reviewed the literature and the instruments that were used for collecting data and determined the appropriate design and statistical analysis. Data analysis and interpretation was conducted by the researcher in conjunction with the Department of Statistics, University of Pretoria.

3.6 Data Analysis

Specific data on socio-demographics, resilience and depressive symptomatology were analysed. From the University of Pennsylvania Computerised Neuropsychological Test Battery (PennCNP), the scores from the Short Raven's Progressive Matrices (SRAVENs) were analysed to determine group differences in non-verbal estimate of fluid intelligence.

Descriptive statistics of the BDI-II and the PR6 were computed. Furthermore, reliability estimates were calculated by means of Cronbach's Alpha for both the BDI-II and the PR6. It was especially important to determine the reliability of the PR6 as it was the first time the instrument was utilised with a South African sample. Multivariate Analysis of Variance (MANOVA) was utilised for the data analysis. MANOVA evaluates mean differences on two or more dependent criterion variables simultaneously and is usually conducted as a two-step process (Bray & Maxwell, 2011). The multivariate (omnibus) test was used to indicate whether the model was significant. Following this a between-subjects analysis was implemented to highlight which domains (vision, composure, tenacity, reasoning, collaboration, and health) in particular, vary by level of symptom severity. Additionally, a pairwise analysis highlighted the groups that showed significant differences in resilience profiles.

3.7 Ethical Consideration

Ethical approval for the original study was granted on 9th March 2018 by the Faculty of Humanities, Postgraduate Research and Ethics Committee (GW0170723HS). All informed consent guidelines were implemented during the original data collection. Participants in the initial study provided permission for data to be made available for future research endeavours. Ethical approval for this study was granted on the 28th of November 2019 by the Faculty of Humanities, Postgraduate Research and Ethics Committee (HUM038/1019). Confidentiality of information was assured since no personal identifiers were used in the protocols. Data will be stored in the Department of Psychology (HSB 11-24) for 15 years as per the University of Pretoria policy.

3.8 Conclusion

Chapter Three outlined the methodology that was employed in the study. A description of the research design, recruitment process and the measuring instruments was provided. Furthermore, the data collection procedure as well as the data analysis method were discussed. Chapter Four will provide a detailed account of the results.

CHAPTER FOUR: RESULTS

4.1 Introduction

In this chapter, the findings of the statistical analysis will be reported. The chapter will provide a detailed description of the participants of the study. Furthermore, the descriptive data from the different measuring instruments will also be reported. A MANOVA was used to indicate whether the response variables on the whole vary by level of symptom severity (minimal, mild, and moderate/severe). Further statistical analysis will be reported to highlight which resilience domains (tenacity, vision, collaboration, composure, reasoning, momentum, and health) in particular, vary by symptom severity.

4.2 Characteristics of Participants

Table 4.1 provides the demographic characteristics of the total sample. A total of 135 participants were recruited and assessed during a five-month period (November 2017 to March 2018). All participants met the inclusion criteria for partaking in the study.

The mean age of participants was 20.27 years ($SD = 1.76$). Females were overrepresented in the sample at 87% compared to 13% males. The majority of the participants reported English as their home language (45%). Furthermore, the majority of the participants were studying towards undergraduate degrees (82%).

All the participants completed all the measuring instruments.

Table 4.1*Demographic Characteristics of the Total Sample*

Demographic characteristic	Frequency	Percentage
Gender		
Female	117	87%
Male	18	13%
Home Language		
English	61	45%
Afrikaans	44	33%
African	28	20%
Other	2	2%
Study Phase		
Postgraduate	24	18%
Undergraduate	111	82%

Note: N=135

4.3 Descriptive Statistics for the BDI-II

Depressive symptomatology can be categorised as cognitive-affective (items 1-14, 17, and 19) and somatic (items 15, 16, 18, 20, and 21) (Ward, 2006). The frequency of the depressive symptomatology reported by the participants is provided in Table 4.2. Each item on the BDI-II is scored on a 4-point continuum where a score of 0 indicates that a symptom was not endorsed and the sum of scores 1-3 indicates the frequency with which a symptom was endorsed by the entire sample.

Table 4.2*Frequency of depressive symptomatology*

Symptom	Frequency	Percentage
Sadness	69	51%
Pessimism	59	44%
Past failure	64	47%
Loss of pleasure	69	51%
Guilty feelings	79	59%
Punishment feelings	39	29%
Self-dislike	69	51%
Self-criticalness	86	64%
Suicidal thoughts/wishes	44	33%
Crying	67	50%
Agitation	88	65%
Loss of interest	67	50%
Indecisiveness	71	53%
Worthlessness	48	36%
Loss of energy	92	70%
Changes in sleeping patterns	115	85%
Irritability	68	50%
Changes in appetite	93	69%
Concentration difficulty	86	64%
Tiredness/fatigue	98	73%
Loss of interest in sex	37	28%

Note: N=135

Table 4.2 indicated that the majority of the participants experienced the somatic symptoms of depression with changes in sleeping patterns being the most common symptom endorsed by participants (85%). Loss of energy (70%), changes in appetite (69%) and tiredness/fatigue (73%) were also commonly endorsed by this student cohort. Of the cognitive-affective symptoms, the participants reported higher levels of agitation and concentration difficulty (65% and 64%, respectively). Furthermore, guilty feelings as well as self-criticalness were endorsed by the participants (59% and 64%, respectively). Approximately a third of students reported suicidal ideation.

Furthermore, the BDI-II classifies the total scores of depressive symptomatology into four levels of severity. Total score ranges include 0-13 for the minimal range, 14-19 for the mild range, 20-29 for the moderate range and 29-63 for the severe range. Table 4.3 outlines the outcome of the different severity levels for the total sample. The mean score of the BDI-II for the total sample was 15.70 (SD=9.92) which can be classified as mild.

Table 4.3

BDI-II Classification of Symptom Severity

Category	Total Score range	n	Percentage
Minimal	0-13	64	47%
Mild	14-19	25	19%
Moderate/severe	20-63	46	34%

Note: n=number of participants

It is important to keep in mind that since the BDI-II is a self-report measure it is subject to response bias (Beck et al., 1996), therefore, scores may be elevated or minimised during the testing situation. Due to the small sample size the moderate/severe categories were merged for statistical analysis. A further rationale for merging the group was based on the premise that for a non-clinical general population, a score of 21 or over is potentially categorised as depression (Beck et al., 1996).

4.4 Descriptive Statistics for the PR6

The PR6 measures resilience by tapping into six domains of resilience (tenacity, vision, collaboration, composure, reasoning, and health). The scale contains 14 items which are self-reported on a 5-point Likert scale ranging from 1 = not at all like me (most negative), 2 = a bit like me, 3 = somewhat like me, 4 = often like me, and 5 = very much like me (most positive). Furthermore, the PR6 provides an overall/total resilience score which is an average of the six domains, ranging from 0 (lowest resilience) to 1 (high resilience)

In addition to these domains, Rossouw and Rossouw (2016) included two items to the PR6 scale to measure approach and avoidance schemas in terms of a sense of direction and openness to new challenges. These items encapsulate an additional domain categorised as momentum. Therefore, the instrument has a total of 16 items. Table 4.4 outlines the descriptive statistics for the PR6.

Table 4.4*Descriptive Statistics for the PR6*

Domain	N	Mean	SD	Minimum	Maximum
Tenacity	135	7.63	2.07	2.00	10.00
Vision	135	6.81	1.85	2.00	10.00
Collaboration	135	5.65	1.88	2.00	10.00
Composure	135	5.71	2.20	2.00	10.00
Reasoning	135	6.53	1.89	2.00	10.00
Momentum	135	6.56	1.96	2.00	10.00
Health	135	6.00	1.74	2.00	10.00
Total resilience	135	0.64	0.13	0.29	0.97

Note: SD=Standard Deviation

Table 4.4 indicated that this group of participants (N=135) is high in resilience (M=.64, SD=.13). Furthermore, the participants show higher tenacity (M=7.63, SD=2.07) in comparison to lower collaboration (M=5.65, SD=1.88) and composure (M=5.71, SD=2.20).

4.5 Reliability

Instrument reliability in research refers to the degree to which the measuring instrument produces consistent results when measuring the same construct (Raykov & Traynor, 2016). Furthermore, a reliable measuring instrument is free from random error (Nel et al., 1997)

4.5.1 Internal consistency

Internal consistency is a method that is commonly used to examine reliability. This method inspects the degree to which each item in a scale correlates with the other items in that scale i.e. whether the instrument is measuring what it should be measuring (Durrheim &

Painter, 2006). Internal consistency for this study was investigated by means of Cronbach's alpha.

The BDI-II and PR6 showed adequate internal consistency with high Cronbach's α of .90 and .81, respectively.

4.6 Inferential Statistics

4.6.1 Hypotheses

The reviewed literature suggested that the university student population may present a different manifestation of depressive symptomatology due to various psychological and socioeconomic factors that influence this context (Bantjes et al., 2016; Peltzer & Pengpid, 2015; Pillay et al., 2002). Additionally, literature also suggested that resilience facets, which underlie the transition from prodromal depression to acute depression, may buffer against increasing depressive symptom severity (Beck et al., 1996; Cameron et al., 2008; Cameron et al., 2011).

Therefore, based on the reviewed literature the following hypotheses were formulated.

H0: The resilience profile of students will not differ significantly across depression severity levels.

H1: The resilience profile of students will differ significantly across depression severity levels.

To test the hypotheses a descriptive analysis of the PR6 for the three groups, categorised according to severity of depressive symptoms, was conducted and a MANOVA was used to explore the possible differences in the resilience domains for each group. A between-subjects analysis indicated that there is no significant difference across the groups.

4.6.2 Descriptive statistics of the PR6 scores for the three groups

Table 4.5 provides the descriptive statistics of the PR6 data for the three groups. The means, standard deviations, and the number of valid cases for each depression group are indicated.

Additionally, Table 4.5 indicates that of the three depressive symptomatology classification groups, the minimal group reported higher overall resilience ($M=.72$, $SD=.1$) compared to the mild group as well as the moderate group, with the moderate/severe group reporting with the lowest resilience ($M=.54$, $SD=1$). Furthermore, the minimal group also reported higher resilience across all the domains. Additionally, a comparison across all three depressive symptomatology classification groups shows a trend toward higher tenacity, with lower collaboration and composure.

Table 4.5*Descriptive Statistics for the PR6 resilience domains across groups*

PR6	Depression	Mean	SD	N
Tenacity	Minimal	8.75	1.31	64
	Mild	7.40	1.96	25
	Moderate/Severe	6.20	2.10	46
	Total	7.63	2.07	135
Vision	Minimal	7.23	1.69	64
	Mild	7.12	1.72	25
	Moderate	6.07	1.95	46
	Total	6.81	1.85	135
Collaboration	Minimal	6.33	1.99	64
	Mild	5.40	1.53	25
	Moderate	4.85	1.53	46
	Total	5.65	1.88	135
Composure	Minimal	6.72	1.99	64
	Mild	5.36	2.10	25
	Moderate	4.50	1.86	46
	Total	5.71	2.20	135
Reasoning	Minimal	7.34	1.58	64
	Mild	6.40	1.80	25
	Moderate	5.48	1.82	46
	Total	6.53	1.89	135
Momentum	Minimal	7.48	1.62	64
	Mild	6.64	1.78	25
	Moderate	5.24	1.77	46
	Total	6.56	1.97	135
Health	Minimal	6.51	1.52	64
	Mild	5.70	1.82	25
	Moderate	5.46	1.80	46
	Total	6.00	1.74	135
Total Resilience	Minimal	.72	.10	64
	Mild	.63	.09	25
	Moderate	.54	1.00	46
	Total	.64	.13	135

4.6.3 Multivariate analysis

Multivariate analysis involves the observation and analysis of more than one variable at a time. The aim of the analysis was to compare the resilience means across the depression severity groups. The following tests were done to test if it is appropriate to use a MANOVA as well as to check the assumptions of MANOVA.

4.6.3.1 Box's test of equality of covariance matrices

Box's test of equality of covariance matrices compares variations in multivariate samples, specifically the homogeneity of two or more covariance matrices. Furthermore, it is sensitive to deviations from normality of the dependent variables (resilience domains) as it assumes that the data is normally distributed (Desai, 2013).

The results of the Box's test of covariance matrices indicated a significance value of 0.280, which is larger than 0.05. This indicates that the assumption of homogeneity has not been violated.

4.6.3.2 Levene's test of equality of error variances

Levene's test of equality of error variance checks the assumption of equality variance – whether variances are equal – before running a MANOVA (Levene, 1960). Table 4.6 presents the statistical results of the Levene's test of equality of error variances.

Table 4.6*Levene's Test of Equality of Error Variances*

Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
Tenacity	5.86	2	132	.08
Vision	.54	2	132	.59
Collaboration	1.26	2	132	.29
Composure	1.50	2	132	.23
Reasoning	3.02	2	132	.05
Momentum	1.31	2	132	.27
Health	3.53	2	132	.06
Total Resilience	.43	2	132	.65

The table indicates that there were no significant variances for the resilience domains across the depression severity groups. Furthermore, based on the above table, it can be assumed that the variances between the depression severity groups are approximately equal. Therefore, a MANOVA is appropriate to further investigate each of the independent groups to see if there are any significant differences.

4.6.4 Multivariate Analysis of Variance (MANOVA)

Multivariate Analysis of Variance (MANOVA) evaluates mean differences on two or more dependent criterion variables simultaneously and is usually conducted as a two-step process (Bray & Maxwell, 2011). A one-way MANOVA was used to determine whether there were any differences between independent groups (depression severity classifications) on more than one continuous dependent variable (resilience domains) (Schott, 2007). Table 4.7 provides the results of the MANOVA.

Table 4.7

Multivariate tests

Multivariate tests							
Effect		Value	F	Hypothesis		Sig.	Partial Eta Squared
				df	Error df		
Intercept	Pillai's Trace	.44	13.88b	7.00	124.00	.000	.44
BDI-II	Pillai's Trace	.24	2.40	14.00	250.00	.004	.12

Note: b. Exact statistic

To determine statistically significant differences among the groups of depression symptomatology severity, Pillai's Trace was used. Pillai's Trace is a powerful and robust statistic (Diaz-Garcia et al., 2008). Table 4.8 indicates that there are significant differences across groups (p value = .004)

It is important to realise that the one-way MANOVA is an omnibus test statistic and cannot ascertain which specific groups were significantly different from each other. A between-subjects test was performed to determine which resilience domains were significantly different across groups (Table 4.8)

Table 4.8

Tests of Between-Subjects Effects

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Depression	Tenacity	37.33	2	18.67	7.33	.00
	Vision	10.08	2	5.04	1.98	.14
	Collaboration	17.07	2	8.53	2.82	.06
	Composure	14.98	2	7.49	2.4	.09
	Reasoning	10.01	2	5.01	2.10	.13
	Momentum	36.12	2	18.06	7.31	.00
	Health	6.60	2	3.30	1.24	.29
	TOTAL Resilience	.156	2	.08	13.19	.00

Table 4.8 indicates that there are significant group differences in the tenacity domain ($p=.001$), momentum domain ($p=.00$), and total resilience ($p=.00$). Following this analysis, a

Bonferroni adjusted pairwise comparison (Table 4.9) was used to determine which of the groups expressed significantly different resilience profiles.

Table 4.9:*Pairwise comparison*

Dependent Variable	(I) Depression	(J) Depression	Mean Difference (I-J)		Sig.	95% Confidence Interval for Difference ^b	
			Mean	SE		Lower Bound	Upper Bound
TENACITY	Minimal	Mild	.87	.389	.080	-.071	1.817
		Moderate	1.432*	.382	.001	.507	2.358
	Mild	Minimal	-.873	.389	.080	-1.817	.071
		Moderate	.559	.417	.546	-.452	1.571
	Moderate	Minimal	-1.432*	.382	.001	-2.358	-.507
		Mild	-.559	.417	.546	-1.571	.452
VISION	Minimal	Mild	.011	.389	1.000	-.933	.954
		Moderate	.695	.381	.212	-.230	1.620
	Mild	Minimal	-.011	.389	1.000	-.954	.933
		Moderate	.684	.417	.309	-.326	1.695
	Moderate	Minimal	-.695	.381	.212	-1.620	.230
		Mild	-.684	.417	.309	-1.695	.326
COLLABORATION	Minimal	Mild	.709	.424	.291	-.319	1.738
		Moderate	.927	.416	.083	-.082	1.935
	Mild	Minimal	-.709	.424	.291	-1.738	.319
		Moderate	.217	.454	1.000	-.885	1.319
	Moderate	Minimal	-.927	.416	.083	-1.935	.082
		Mild	-.217	.454	1.000	-1.319	.885
COMPOSURE	Minimal	Mild	.783	.424	.201	-.245	1.811
		Moderate	.789	.416	.180	-.220	1.797
	Mild	Minimal	-.783	.424	.201	-1.811	.245
		Moderate	.006	.454	1.000	-1.096	1.108
	Moderate	Minimal	-.789	.416	.180	-1.797	.220
		Mild	-.006	.454	1.000	-1.108	1.096
REASONING	Minimal	Mild	.489	.376	.589	-.424	1.401
		Moderate	.732	.369	.148	-.163	1.626
	Mild	Minimal	-.489	.376	.589	-1.401	.424
		Moderate	.243	.403	1.000	-.735	1.221
	Moderate	Minimal	-.732	.369	.148	-1.626	.163
		Mild	-.243	.403	1.000	-1.221	.735
MOMENTUM	Minimal	Mild	.555	.383	.450	-.375	1.484
		Moderate	1.436*	.376	.001	.525	2.347
	Mild	Minimal	-.555	.383	.450	-1.484	.375
		Moderate	.881	.411	.101	-.115	1.877
	Moderate	Minimal	-1.436*	.376	.001	-2.347	-.525
		Mild	-.881	.411	.101	-1.877	.115
HEALTH	Minimal	Mild	.578	.399	.448	-.389	1.544
		Moderate	.451	.391	.752	-.497	1.399
	Mild	Minimal	-.578	.399	.448	-1.544	.389
		Moderate	-.127	.427	1.000	-1.162	.909
	Moderate	Minimal	-.451	.391	.752	-1.399	.497
		Mild	.127	.427	1.000	-.909	1.162
Total Resilience	Minimal	Mild	.057*	.019	.008	.012	.103
		Moderate	.092*	.018	.000	.048	.137
	Mild	Minimal	-.057*	.019	.008	-.103	-.012
		Moderate	.035	.020	.246	-.013	.084
	Moderate	Minimal	-.092*	.018	.000	-.137	-.048
		Mild	-.035	.020	.246	-.084	.013

Note: Based on estimated marginal means;*. The mean difference significant at the .05 level; b. Bonferroni adjusted.

Table 4.9 indicates that there were significant differences in total resilience between the minimal and mild ($p=.008$) groups and the mild and moderate/severe ($p=.000$) groups. The minimal group reported higher total resilience. Furthermore, the results indicate significant difference between the moderate/severe group and the minimal group particularly in the tenacity domain ($p=.001$) as well as the momentum domain ($p=.001$). The interpretation of the results will be discussed in the following chapter.

4.7 Conclusion

This chapter presented the demographic information of the sample as well as the statistical information and analysis of the variables that were investigated. Chapter Five will provide a comprehensive discussion of the results from the statistical analysis. Furthermore, the limitations of the study will be discussed alongside the recommendations for future research.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

The aim of the study was to explore the differences in students' resilience profiles across groups with different depressive symptomatology classifications. The results indicated that there were specific resilience profiles across groups, together with distinct total scores across groups. This chapter provides a comprehensive discussion of the research results presented in the previous chapter in the context of literature that is relevant to the study as well as the research question. This chapter will also discuss the practical implications that these results have for student support services in universities. The strengths and shortcomings of the current study will also be presented alongside recommendations for future research.

5.2 Depression Severity Among University Students

The study used the Beck Depression Inventory-2nd Edition (BDI-II) to identify the presence and severity of state-based depressive symptomatology (Beck et al., 1996). The BDI-II is a psychometrically sound instrument to measure state-based depression severity, globally as well as in the South African context (Makhubela & Mashegoane, 2016). Although the instrument is a self-report measure, it has been commonly used in both clinical and research practice (Smarr & Keefer, 2011).

The results indicated that approximately half of the students in the study reported mild to moderate/severe depressive symptomatology, with the remaining 47% indicating minimal symptoms. Furthermore, more than a third of the students reported moderate/severe depressive symptomatology. These prevalence patterns are echoed by studies conducted in South African universities and globally (Farrer et al., 2016; Mungai & Bayat, 2019). For example, a study among medical students in Cameroon indicated that of the students who participated in the

study, approximately 65% of them were classified with moderate to severe depression (Ngasa et al., 2017). Additionally, similar results have been reported from a study using a different instrument to measure depression symptom severity. In a study exploring the prevalence of depression, anxiety and stress among medical students and the association of these conditions with substance use, Van Zyl et al. (2017) found that the majority of the medical students in their study reported moderate depressive symptom severity on the Depression Anxiety and Stress Scales. The results of this study as well as those of studies using different instruments to measure depression symptom severity do not only highlight the high prevalence of depression within the student population but they also support the necessity of exploring student mental health and the development of interventions suitable for this high-risk group. For example, Van Zyl et al. (2017) further indicated that depression was most common among individuals who use substances such as nicotine and alcohol as coping strategies, suggesting that resilient behaviour and coping mechanisms should be introduced to students in the early phases of their academic journeys.

In the current study, the BDI-II was used to identify which of the cognitive-affective and somatic symptoms of depression the students experienced frequently. There is limited research detailing the prevalence patterns for each of the individual subscales measured in the BDI-II among university students. The results of this study indicated that approximately over half of the students experienced both the cognitive-affective symptoms as well as the somatic symptoms.

Of the cognitive-affective symptoms, agitation, concentration difficulty, and self-criticalness were commonly experienced by students. These results are in line with those found in studies that have reported that cognitive impairments are commonly associated with depression symptom severity (Doumas et al., 2012; Marazziti et al., 2010). Similarly, these

cognitive impairments have been consistently associated with factors that contribute to poor academic performance. Therefore, the prevalence of moderate/severe depressive symptomatology reported in this student sample raises greater concern regarding the adverse effects of depressive symptomatology on academic performance and through-put rates, especially if students do not seek the relevant help to cope with and manage the depressive symptoms.

Furthermore, approximately a third of students in this cohort reported to be experiencing suicidal ideation. A study by Mustaffa et al. (2014) verified that there is significant correlation between suicidal ideation and depression in college students. They reported that higher levels of depression enhance higher levels of suicidal ideation among college students in Malaysia. Therefore, it can be inferred that students who present with moderate/severe depression may have suicidal ideation as a presenting symptom.

Furthermore, literature suggested that suicidal ideation, as a symptom of depression, is commonly associated with suicidal behaviour among university students, and thus poses a risk to students' achievement of their academic goals (Bantjes et al., 2016; Cukrowkz et al., 2011). However, Cukrowkz et al. (2011) indicated that although suicidal ideation is usually prominent in students with severe depression, it has also been associated with subclinical depressive symptoms among university students. This further highlights that a low prevalence of suicidal ideation is not indicative of lower risk and could lead to negligence in the implementation of interventions as focus is usually put on groups presenting with severe depression.

The results in the study also indicated that majority of the students experienced the somatic symptoms of depression. Of these symptoms, loss of energy, changes in appetite, change in sleep patterns, and tiredness/fatigue were predominantly experienced by the students. A study by Fenta et al. (2010) similarly reported that somatic symptoms are significantly

associated with major depression. Furthermore, Rakofsky et al. (2013) identified that the neurovegetative and somatic symptoms of depression were ‘continuum’ symptoms because they tended to increase across depression severity groups. Although, de Sa Junior et al. (2019) reported that the somatic symptoms of depression have commonly been associated with females, it cannot be assumed that the manifestation of somatic symptomatology within this cohort was due to the predominance of female participants, as gender differences were not actively accounted for in the study.

Furthermore, although the results of this study indicated a predominantly somatic presentation of depression symptomatology within this cohort, the results are consistent with the prevalence patterns reported within the South African university context.

5.3 Resilience among University Students

The Predictive Six-Factor Resilience Scale (PR6) was used to measure psychological resilience. As noted in the review of literature on resilience, one of the PR6’s unique contributions is its conceptualisation and measurement of resilience from a neurobiological perspective (Rossouw & Rossouw, 2016). Although the PR6 had not been used in the South African context at the time of this study, statistical analyses indicated good reliability for measuring resilience.

The total resilience score found in this study cohort suggested that students were high in resilience. Findings from previous studies, which have made use of different instruments and scales to measure psychological resilience, support these results (Borjian, 2018; Hjemdal, 2011; McGillivray & Pidgeon, 2015). In their study of resilience attributes among university students, McGillivray and Pidgeon (2015) reported that over half of the students in their study who took The Resilience Scale (RS-14) were high in resilience. Similarly, Erdogan, Ozdogan

and Erdogan (2014) reported high levels of resilience among 596 university students in Turkey from various fields and faculties who used the Resiliency Scale. The results of this study as well as those from other studies suggest that although university students are faced with varying mental health and academic challenges, they are also resilient.

Furthermore, higher resilience has been associated with lower levels of psychological distress (McGillivray & Pidgeon, 2015). Psychological distress has further been connected to poor academic performance and sleep disturbances within the university context (McGillivray & Pidgeon, 2015). For example, in a study using the Resilience Scale for Adolescents, Hjemdal et al. (2011) reported that higher resilience scores were found to be consistently and significantly related to lower depression, anxiety, stress and obsessive-compulsive symptoms in older adolescents. Additionally, Borjian (2018) conducted a study among students which revealed that resilience contributed to academic success in the presence of economic and political stress. These findings further provide insight into the overlap between the resilience domains in the PR6 as well as the depressive symptomatology prevalent in this student cohort, particularly how these interactions may influence students' academic success.

Rossouw and Rossouw (2016) proposed that resilience is multi-dimensional, consisting of six domains which contribute to overall resilience. Therefore, in this study, the PR6 provided domain scores which were used to identify which of the resilience domains (vision, composure, tenacity, reasoning, collaboration, and health) were prevalent among university students with different levels of depressive symptomatology.

The vision domain refers to an individual's sense of purpose and goal-striving behaviour. Skills such as being able to define and clarify one's goals as well as developing congruence between goals are associated with this domain (Rossouw & Rossouw, 2017). The reasoning domain relates to problem-solving, resourcefulness and being ready for change. The

skills associated with this domain are those that are linked to the executive functions of the brain and academic success (Goldstein et al., 2014). Among this student cohort, no significant differences were reported for the vision domain and the reasoning domain across the groups of severity. However, studies have indicated that executive function mechanisms (such as those related to the two domains) are usually compromised in clinical populations (Doumas et al., 2012; Marazziti et al., 2010). Therefore, it can be inferred that there was no significant difference for these domains across the groups because the majority of this student sample reported minimal-mild symptoms (thus pre-clinical). A momentum factor, which measures one's approach, direction and openness to new challenges, was also included (Rossouw & Rossouw, 2017) as well as a health domain which includes physical hygiene factors such as sleep, nutrition and exercise.

The tenacity domain relates to common aspects of resilience such as hardiness and perseverance. The collaboration domain looks at attachment, maintaining social perceptions and relationships. Lastly, composure relates to stress-management, emotional awareness and emotional regulation. The results presented a pattern towards high tenacity, with low collaboration and composure.

5.4 Depressive Symptomatology Severity and Resilience Profiles

The results of the MANOVA indicated that there were significant differences in total resilience and resilience profiles across the groups. It was hypothesised, in this study that the resilience profile of students would differ significantly across depression severity levels. A study by Southwick and Charney (2012) illustrated that lower depression levels were negatively correlated with higher resilience. Furthermore, they indicated that resilience played a protective role in the onset of MDD (Southwick & Charney, 2012). They outlined some of the protective factors of resilience, such as improved emotional regulation, strong social skills,

strong physical health, and effective regulation of the HPS axis in response to stress, all of which correspond with the domains of resilience measured by the PR6. Additionally, they also indicated that individuals who tend to have multiple protective factors are likely to have higher resilience. These findings collaborate the trend reported in this study, which showed that the minimal group (pre-clinical) reported the highest overall resilience compared to the other severity groups, with the moderate/severe (clinical) group reporting the lowest resilience. The minimal group also reported higher resilience across all the resilience domains. Therefore, it can be supported that the existence and interplay of the various facets/domains of resilience may play a protective role in the progression of depression symptom severity.

Overall results further indicated that students with different depressive severity levels showed significantly different resilience profiles specific to tenacity, momentum and total resilience. Rossouw and Rossouw (2017) suggested that tenacity relies firstly on knowing what one must persist towards. Secondly, it relies on making a conscious decision to continue along one's chosen path. Additionally, from a neurological perspective, Keller et al. (2012) indicated that neural structures include the ability of the prefrontal cortex to downregulate HPA activation to overcome adversity and sustain goal-directed activity. It is then the dopaminergic neurons that come from the ventral tegmentum which play a role in the motivation that is required for one to be able to persist despite adversity and challenge (Keller et al., 2012). Therefore, this suggests that although students are exposed to a stressful context, their ability to engage in goal-directed tasks will regulate stress responses by downregulating HPA activation; potentially buffering the progression of depression symptom severity. As Southwick and Charney (2012) have also highlighted, this is a facet of resilience that interventions could focus on to help buffer against the transition from prodromal to clinical.

Additionally, although there were no significant differences for the groups in the collaboration and composure domain, these two domains had the lowest scores across all the groups. Considering that composure involves stress-management, it can be inferred that the type of coping strategies that these students engage in influenced their scores in the composure domain. For example, literature illustrated that students who are high in conscientiousness are most likely to cope better during stressful situations (Ramasubramanian, 2017; Rossouw & Rossouw, 2016). The results of the BDI-II indicated that self-criticalness was endorsed by 64% of the participants. Additionally, although the results indicated that all three of the severity groups scored low in the composure domain, it further illustrated that the minimal group (comprising 47% of the total sample) was higher in composure than the mild and moderate/severe groups. Therefore, it can be inferred that the type of coping strategies that students engage in may influence the duration of their stressed state and consequently the duration and severity of their depressive symptomatology.

Furthermore, Rossouw and Rossouw (2017) contrasted the momentum factor as a forward-looking measure rather than a point-in-time measurement. Momentum considers one's approach and avoidance motivational schemas, which predict goal achievement. For example, a study by Owen (2012) indicated that resilience is related to some of the executive functions such as problem-solving and the ability to engage in flexible thought patterns when faced with adversity. Therefore, it can be inferred that students' appraisal of the stressful university environment, their problem-solving approaches and their avoidance attitudes may also contribute to differences in their depression severity profiles (Owen, 2012; Rossouw & Rossouw, 2017).

Significant differences in resilience profiles were identified between the moderate/severe group and the minimal group on both the tenacity domain and the momentum

domain. Rabin et al. (2011) indicated that academic procrastination (the intentional delay of due tasks) is a common phenomenon in the university context. They further indicated that procrastination, particularly its impact on goal-directed behaviours (momentum factor), is a function of the executive functions which influence student's persistence and in turn the tenacity domain of resilience. Furthermore, a study detailing the prevalence of depression among undergraduate university students in Tokyo reported that optimism towards the future was inversely related with mild to severe depressive symptoms (Lun et al., 2018). The results indicated that higher scores in the momentum domain were associated with the minimal depressive symptomatology classification, supporting the findings in Rabin et al.'s (2017) study as the minimal group was indeed high in both momentum as well as tenacity. Studies also revealed that prolonged and consistent feelings of hopelessness (associated with the momentum domain) is a common symptom of severe levels of depression (Panagioti et al., 2012; Wang et al., 2015).

Additionally, overall resilience differed significantly between the minimal and mild group as well as the minimal and moderate/severe group. It can be hypothesised that the significant differences in overall resilience between the 'non-depressed' (minimal) and 'depressed' (mild/moderate/severe) categories may potentially reflect the profiles associated with preclinical and clinical depressive symptomatology, respectively. Based on the results it can be inferred that overall resilience may underlie the potential progression from prodromal depression to levels of severity in a more linear way. In contrast, specific facets of resilience (tenacity and momentum) may play more of a role when considering a more dramatic progression from a prodromal stage to moderate/severe symptom manifestation.

Although no significant differences were found for the health domain and depression severity in the current study, studies detailing the effect of physical activity on depression and

anxiety in non-clinical populations indicated that physical activity (health domain) reduces depression (Biddle & Asare, 2011; Jerstad et al., 2011; Rebar et al., 2011). Therefore, as sleep, nutrition and exercise factors of resilience overlap with the somatic and cognitive features observed in depressive individuals, it can be inferred that individuals who experience severe depression symptomatology would have lower scores on the PR6 health domain of resilience (Rossouw & Rossouw, 2016). These findings are also mirrored in the current study which illustrated a trend towards what is found in the literature, even though the results are not statistically significant.

The overall results of this study highlight the underlying neuroscience framework for understanding the role of resilience in mental health, the unique manifestation of depressive symptomatology among university students and the potentially preventative role played by facets of resilience on symptom severity. Furthermore, the neurobiological understanding of resilience, would help in developing intervention strategies focused on facets of resilience, which may buffer the transition from prodromal to severe depression.

5.5 Prevention and Intervention Strategies for Student Mental Health Services

The primary aim of student support divisions is to create an environment for all learners to achieve their academic goals and maintain a balanced sense of health. However, literature indicated that it has become a common phenomenon for these student support divisions to be consistently overwhelmed as the university context presents with a higher demand for mental health services than the general public (Farrer et al., 2016; Mungai & Bayat, 2019; Stallman, 2010).

A study by Kumaraswamy (2013) indicated that academic stress, anxiety, and depression are the common concerns brought forward by students in university. Additionally,

complaints regarding lowered self-esteem, psychosomatic issues, alcohol and substance abuse and suicidal thoughts or behaviour were identified by Kress et al. (2015). In the South African context, these concerns among university students are further exacerbated by the country's unique demographic features due to varying social, political and economic factors (Gibbs et al., 2018; Peltzer & Phaswana-Mafuya, 2013). Therefore, it is necessary for university students to have the opportunity to seek counselling services from their university support divisions and for these student support divisions to be equipped efficiently.

Research has indicated the protective role of resilience in the transition of depression from prodromal depression to more acute depression symptom severity (Chmitorz et al., 2018; Masten et al., 1990; Shaw, 2016). Furthermore, research indicated that resilience can be acquired over time and can thus be fostered through various interventions (Southwick & Charney, 2012). For example, a study by Catalano et al. (2011) indicated that resilience does not only buffer the perceptions of stress on depressive symptoms but that it can also be acquired through resilience-based interventions. Furthermore, as it was highlighted in the results of this study that lower scores in the composure domain were associated with higher levels of depression severity; interventions that train students on developing coping skills can improve resilience and overall mental health (Poole et al., 2017; Ramasubramanian, 2017; Zimmerman et al., 2013).

Ongoing research points to resilience having neurobiological underpinnings (Rossouw & Rossouw, 2017). Furthermore, the conceptualisation of resilience as an intrinsic trait has been replaced by an understanding of it as a dynamic and modifiable and multidimensional state and process (Martin & Marsh, 2016). Therefore, the development and implementation of interventions that are based on the neurobiological underpinnings of resilience could ensure that this facet of resilience is enhanced among university students. For example, Southwick

and Charney (2012) suggested that interventions that focus on neural circuit training such as mindfulness meditation which “exert their adaptive effects on emotion regulation by enhancing prefrontal cortex regulation of limbic and brainstem systems” (p. 81) can increase resilience among university students.

Furthermore, research indicated that group and peer-based interventions help reduce symptoms of depression (Pfeiffer et al., 2011) and the use of group interventions is effective in resource-constrained environments as it enables an expansive use of the resources across large groups (Trickett et al., 2011). This would be an applicable consideration for interventions in the South African university context where there are already concerns regarding the availability of resources and time constraints in the offering of individual counselling. Results from this study indicated that low collaboration was associated with higher depressive symptomatology, suggesting that group interventions could not only foster resilience, but could consequently also reduce the severity of depressive symptoms. Therefore, university student divisions could develop and introduce social-emotional training programs that focus on enhancing prosocial behaviour as well as network support interventions that will assist students to maintain supportive social networks (Southwick & Charney, 2012).

However, Naidoo and Cartwright (2020) reflected that shifts in student mental health and psycho-social behaviour, because of the virtualisation posed by issues such as the recent COVID-19 pandemic as well as the long-term effects of the industrial revolution, are factors that need to be considered in the implementation of such programmes to ensure that they are inclusive of all students. These considerations are particularly important in the psychosocial demographic of South African universities, as outlined in the literature (Bantjes et al., 2016; Peltzer & Pengpid, 2015; Pillay et al., 2002).

5.6 Summary

The current study indicated that students tend to experience both the cognitive-affective and the somatic symptoms of depression, with agitation, concentration difficulty, self-criticalness, loss of energy, changes in appetite, change in sleep patterns, and tiredness/fatigue as common symptoms. Additionally, the results of this study also support literature findings that indicated that the neurovegetative and somatic symptoms of depression are considered 'continuum' symptoms as they tend to increase across depression severity groups. These patterns are concerning within a student population as severity of depression is associated with poor processing speed and thus poor academic performance (Snyder, 2013).

University students in this study and those of studies which used different resilience instruments reported high resilience (Borjian, 2018; Catalano et al., 2011). Studies indicated that resilience not only has a protective mental health outcome, but that high resilience is consistently and significantly related to less severe depression (Hjemdal et al, 2011). The current study reported significant differences in the tenacity domain of resilience, suggesting that students' ability to engage in goal-directed tasks may regulate their stress responses and coping strategies. Furthermore, significant differences were found in the momentum domain of resilience across the groups, associating higher scores in the momentum domain with the minimal depressive symptomatology classification.

Lastly, although no significant differences were found in the other domains of resilience, literature as well as the findings of this study confirm the importance of developing interventions that are inclusive of the multi-dimensional facets of resilience to ensure that students with preclinical symptoms or in a prodromal stage also benefit from interventions that may potentially prevent transition to severe stages.

5.7 Strengths and Limitations of the Study and Recommendation for Future Research

The exponential increase in suicidal behaviour and depression among university students, as well as the limited research on resilience profiles among groups with different depressive symptom classification, formed the underlying rationale for this exploratory study (Bantjes et al., 2016; Gress-Smith et al., 2013). Considering the literature espousing the protective role that resilience plays in the treatment and progression of depression, this study further indicated that distinct multidimensional facets of resilience may be salient indicators of symptom progression.

Additionally, studies which explored the association between resilience and depression symptomatology were limited in their exploration of how resilience profiles manifest differently in subclinical depression and across severity levels (Min et al., 2013; Poole et al., 2017). If resilience is conceptualised as a dynamic multifaceted construct, the understanding of distinct resilience profiles across the depression severity continuum, may better inform focused interventions at student centres, particularly among individuals with minimal/mild features.

Furthermore, considering the literature's identified overlap between the neurological underpinnings of resilience as well as the psychosomatic and cognitive-affective symptoms of depressions, the use of a resilience measure that undertakes a neurobiological perspective is another strength of this study. Moreover, this was the first time the PR6 was used in the South African context.

The limitations of this study lie firstly in the sample size that was used. The sample consisted of students who were registered for psychology modules at the University of Pretoria. The use of this sample limits the generalisation of the results across gender and level of study

as most of the participants were female students and undergraduate students. More comprehensive sociodemographic data may also have enhanced the robustness of findings and controlled for confounding variables. Furthermore, due to the small sample size, the group categories were also limited in size. Therefore, future research should include broader samples that will be representative of the university context. Secondly, another limitation of the study relates to the use of a self-report measure such as the BDI-II. Therefore, the results may be subject to response bias and social desirability bias. There is a possibility that the participants may have exaggerated or underreported depressive symptoms.

5.8 Conclusion

The study aimed to explore the differences in students' resilience profiles across groups with different depressive symptomatology classifications.

An overlap between the neurological underpinnings of resilience as well as the psychosomatic and cognitive-affective symptoms of depression is acknowledged and warrants an integrated approach to the study of depression and the use of a resilience measure that undertakes a neurobiological perspective (Zimmerman et al., 2013).

Resilience has consistently been reported as a buffer in the progression of depression symptomatology (Cameron et al., 2011; Cameron et al., 2008). However, this study indicated the distinct multidimensional facets of resilience which may feature at different levels of severity and among different groups with minimal, mild and moderate/severe depressive symptomatology.

The modifiable and multidimensional state of resilience and the reported effectiveness of group interventions in resource and time-constrained contexts, group interventions in university student support divisions could foster resilience and reduce the severity of

depressive symptoms within this group. Therefore, considering the trend towards high tenacity among all the severity groups, university student support divisions could ensure that they implement resilience enhancing interventions such as goal-setting and time-management workshops. Such interventions may enable these students to build resilience resources for better mental health outcomes and they may further help prevent progression from prodromal/subclinical symptomatology to more severe stages.

As such, further research on depressive symptomatology severity and resilience among South African university students is recommended to develop efficacious and context-sensitive interventions, which acknowledge the neurobiological substrates of resilience.

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