

**MASTERS DEGREE IN SOCIAL AND PSYCHOLOGICAL  
RESEARCH**

---

**STRESS LEVELS, SENSE OF COHERENCE AND COPING  
STRATEGIES AMONG STUDENTS AT A SOUTH  
AFRICAN UNIVERSITY.**

---

Fungai Matumba

Student Number: 894022

Research Supervisor: Professor Gillian Finchilescu



“A research project in partial fulfilment of the requirements for the degree of MA by Coursework and Research in the field of Social and Psychological Research in the Humanities, University of Witwatersrand, Johannesburg, 30 March 2020”.

**DECLARATION**

I declare that this research project is my own, unaided work. It has not been submitted before any other degree of examination at this or any other university.

Signature: 

Date: 30 March 2020

Word count: 28 318

## **ACKNOWLEDGEMENTS**

First and foremost, I would like to give thanks to the 'Most High, Jehovah, God Almighty' for giving me an opportunity to conduct this study.

I would also like to express my gratitude to the following individuals, who made this research report possible:

- To my loving husband, Charles Matumba, for the unwavering support, advice and encouragement during my studies.
- To my supervisor, Professor Gillian Finchilescu, for the sacrificed time, mentorship, guidance, patience, support and feedback.
- To my parents, Ms Julia Maposa and the late Mr Ephias Maposa, for laying a foundation for my education.
- To my kids Tintswalo, Makaitaishe and Mikaela for understanding, you are the reason 'I kept on pushing'.
- To my prayer partners for the prayers and encouragement.
- To my South African Medical Research Council supervisors, Dr Egbe and Ms Rich, for the support, encouragement and advice.

## ABSTRACT

**Background:** University education is crucial to the South African economy since it empowers students with skills, knowledge and attitudes for the world of work. Students with a manageable level of stress are ready to face academic challenges and mostly succeed in their studies. An estimated 80% of university students worldwide were reported to have experienced academic stress at some point during their studies, due to a variety of university demands. Research has indicated that there is a high prevalence of stress among university students, and that medical students are more stressed than non-medical students. Continuous and excessive stress has a potential impact on the students' health, mental state and academic performance. Universities need to be aware of factors such as the students' Sense of Coherence (SOC) and their choice of coping strategies which determine stress levels, since it is crucial in the designing of intervention strategies. SOC was hypothesised to moderate the relationship between stress and the four components of stress coping strategies: Active Emotional Coping (AEC), Passive Emotional Coping (PEC), Active Problem Coping (APC) and Passive Problem Coping (PPC).

**Objectives:** The objective of this study was to examine the relationships among stress, Sense of Coherence and coping strategies. It also aimed at comparing stress levels among medical and non-medical students.

**Methodology:** A non-experimental, correlational, between subjects and cross-sectional survey design was used with a sample (N=366) of students, at a selected South African University. The total sample consisted of 286 females (78.7%) and 77 males (21%) and 2 others (0.3%) who refused to disclose their gender status. Stress was measured by the Perceived Stress Scale, Sense of Coherence by the Orientation to Life Scale, and Coping Strategies by the Stress Coping Inventory. The Statistical Package for Social Sciences (SPSS) version 25 was used to conduct Pearson Correlations, Confirmatory Factor Analysis, T-tests, Moderated Regression Analysis and Frequencies.

**Results:** Results showed that there were no statistically significant differences in the stress levels of medical and psychology students.

Female students reported significantly higher stress levels than male students. Single students reported significantly higher stress levels than married students. Students with children reported significantly higher stress levels than those without children. Perceived stress had a negative statistically significant relationship with SOC, AEC and APC but had a statistically positive relationship with PEC and PPC. A positive, statistically significant relationship was found between SOC and active coping strategies. SOC also had a negative statistically significant relationship with passive coping strategies. Results also showed that SOC moderated the relationship between Perceived stress and all the components of stress coping, except for AEC.

**Conclusions:** Perceived stress, SOC and components of stress coping affect the mental health of students, this in turn affects their academic performance. SOC influences the type of coping strategies students adopt to deal with stressful academic events. The type of coping strategies a student adopts determines their stress levels. Universities need to design stress reduction interventions, strengthen the students' SOC and assist them in choosing active coping strategies that can reduce their stress levels.

**Key words:** Academic performance, coping strategies, Sense of Coherence, stress, University students.

## TABLE OF CONTENTS

|                                                                                |           |
|--------------------------------------------------------------------------------|-----------|
| <b>DECLARATION.....</b>                                                        | <b>1</b>  |
| <b>ACKNOWLEDGEMENTS .....</b>                                                  | <b>2</b>  |
| <b>ABSTRACT .....</b>                                                          | <b>3</b>  |
| <b>LIST OF TABLES .....</b>                                                    | <b>9</b>  |
| <b>LIST OF FIGURES.....</b>                                                    | <b>10</b> |
| <b>CHAPTER 1: INTRODUCTION .....</b>                                           | <b>11</b> |
| <b>CHAPTER 2: LITERATURE REVIEW .....</b>                                      | <b>17</b> |
| ACADEMIC PERFORMANCE.....                                                      | 17        |
| ACADEMIC STRESS AND UNIVERSITY STUDENTS .....                                  | 19        |
| <i>An overview of stress .....</i>                                             | <i>21</i> |
| <i>Components of stress.....</i>                                               | <i>22</i> |
| <i>Models of stress.....</i>                                                   | <i>23</i> |
| COPING STRATEGIES AND UNIVERSITY STUDENTS.....                                 | 28        |
| <i>An overview of coping strategies.....</i>                                   | <i>29</i> |
| <i>Components of Coping Strategies.....</i>                                    | <i>30</i> |
| <i>Types of coping strategies.....</i>                                         | <i>31</i> |
| <i>Factors influencing coping skills and coping abilities.....</i>             | <i>32</i> |
| <i>Models of coping strategies .....</i>                                       | <i>32</i> |
| SENSE OF COHERENCE AND UNIVERSITY STUDENTS .....                               | 35        |
| <i>An overview of Sense of Coherence.....</i>                                  | <i>36</i> |
| <i>Components of Sense of Coherence.....</i>                                   | <i>37</i> |
| <i>The Salutogenic Model of Sense of Coherence.....</i>                        | <i>38</i> |
| THE RELATIONSHIP BETWEEN STRESS, SENSE OF COHERENCE AND COPING STRATEGIES..... | 40        |
| <i>The buffering effects of Sense of Coherence.....</i>                        | <i>41</i> |
| <i>The moderating role of Sense of Coherence .....</i>                         | <i>41</i> |
| <i>Underlying rationale for the current study.....</i>                         | <i>42</i> |
| .....                                                                          | 42        |
| RESEARCH OBJECTIVES .....                                                      | 43        |
| RESEARCH QUESTIONS .....                                                       | 43        |
| <i>Main Research Question.....</i>                                             | <i>43</i> |
| <i>Sub Research Questions.....</i>                                             | <i>43</i> |
| <b>CHAPTER 3: RESEARCH METHODS.....</b>                                        | <b>44</b> |
| RESEARCH DESIGN .....                                                          | 44        |
| <i>Measuring Instruments.....</i>                                              | <i>45</i> |

|                                                                                                                                      |           |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <i>Demographic Questionnaire .....</i>                                                                                               | <i>45</i> |
| <i>The Orientation to Life Scale or Sense of Coherence Scale.....</i>                                                                | <i>45</i> |
| <i>Stress Coping Style Inventory (Lin &amp; Chen, 2010) .....</i>                                                                    | <i>46</i> |
| <i>The Perceived Stress Scale (PSS) (Cohen, Kamarck &amp; Mermelstein, 1983) .....</i>                                               | <i>47</i> |
| RESEARCH PROCEDURE .....                                                                                                             | 47        |
| DATA ANALYSIS.....                                                                                                                   | 48        |
| <i>Descriptive statistics.....</i>                                                                                                   | <i>48</i> |
| <i>Reliability .....</i>                                                                                                             | <i>49</i> |
| <i>Correlations.....</i>                                                                                                             | <i>49</i> |
| <i>Independent Sample T-Test.....</i>                                                                                                | <i>50</i> |
| <i>Moderated regressions.....</i>                                                                                                    | <i>50</i> |
| <b>CHAPTER 4: RESEARCH RESULTS .....</b>                                                                                             | <b>53</b> |
| INTRODUCTION .....                                                                                                                   | 53        |
| SAMPLE CHARACTERISTICS .....                                                                                                         | 53        |
| DESCRIPTIVE STATISTICS AND MEASUREMENT SCALE .....                                                                                   | 56        |
| NORMAL DISTRIBUTION .....                                                                                                            | 57        |
| CRONBACH ALPHA TEST OF THE MEASUREMENT SCALES .....                                                                                  | 57        |
| CONFIRMATORY FACTOR ANALYSIS .....                                                                                                   | 59        |
| <i>Confirmatory Factor Analysis of Coping Strategies .....</i>                                                                       | <i>59</i> |
| CORRELATION ANALYSIS.....                                                                                                            | 61        |
| <i>Is there a relationship between Perceived Stress and subscales of Sense of Coherence? .....</i>                                   | <i>61</i> |
| <i>Is there a relationship between Perceived stress and subscales of Coping strategies? .....</i>                                    | <i>62</i> |
| <i>Is there a relationship between Perceived Stress and full scales of Sense of Coherence and Components of Stress Coping? .....</i> | <i>62</i> |
| INDEPENDENT SAMPLE T TESTS .....                                                                                                     | 63        |
| <i>Are there any differences between stress levels of medical and non-medical students?.....</i>                                     | <i>63</i> |
| <i>Are there any differences between stress levels of male and female students?.....</i>                                             | <i>64</i> |
| <i>Are there any differences between stress levels of married students and single students?.....</i>                                 | <i>64</i> |
| <i>Are there any differences between students who are parents and those who are not?.....</i>                                        | <i>64</i> |
| MODERATION REGRESSION ANALYSIS .....                                                                                                 | 64        |
| <i>Does Sense of Coherence moderate the relationship between Active Emotional Coping and Perceived Stress? .....</i>                 | <i>65</i> |
| <i>Does Sense of Coherence moderate the relationship between Passive Emotional Coping and Perceived Stress? .....</i>                | <i>65</i> |
| <i>Does Sense of Coherence moderate the relationship between Active Problem Coping and Perceived Stress? .....</i>                   | <i>67</i> |

|                                                                                                                                     |           |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <i>Does Sense of Coherence moderate the relationship between Passive Problem Coping and Perceived Stress? .....</i>                 | <i>68</i> |
| <b>CHAPTER 5: DISCUSSION, CONCLUSIONS, PRACTICAL IMPLICATIONS, LIMITATIONS AND DIRECTIONS FOR FURTHER STUDIES .....</b>             | <b>70</b> |
| SENSE OF COHERENCE ON PERCEIVED STRESS .....                                                                                        | 70        |
| <i>Meaningfulness on Perceived stress .....</i>                                                                                     | <i>71</i> |
| <i>Manageability on Perceived stress. ....</i>                                                                                      | <i>71</i> |
| <i>Comprehensibility on Perceived stress.....</i>                                                                                   | <i>71</i> |
| COPING STRATEGIES ON PERCEIVED STRESS .....                                                                                         | 72        |
| <i>Active Emotional Coping on Perceived Stress.....</i>                                                                             | <i>72</i> |
| <i>Passive Emotional Coping on Perceived Stress.....</i>                                                                            | <i>72</i> |
| <i>Active Problem Coping on Perceived Stress .....</i>                                                                              | <i>72</i> |
| <i>Passive Problem Coping on Perceived Stress .....</i>                                                                             | <i>72</i> |
| SENSE OF COHERENCE AND COMPONENTS OF COPING STRATEGIES .....                                                                        | 73        |
| <i>Active Emotional Coping and Sense of Coherence.....</i>                                                                          | <i>73</i> |
| <i>Passive Emotional Coping and Sense of Coherence.....</i>                                                                         | <i>73</i> |
| <i>Active Problem Coping and Sense of Coherence .....</i>                                                                           | <i>73</i> |
| <i>Passive Problem Coping and Sense of Coherence .....</i>                                                                          | <i>73</i> |
| THE MODERATING ROLE OF SENSE OF COHERENCE .....                                                                                     | 74        |
| <i>Does sense of coherence moderate the relationship between active emotional coping and perceived stress? .....</i>                | <i>74</i> |
| <i>Does sense of coherence moderate the relationship between passive emotional coping and perceived stress? .....</i>               | <i>74</i> |
| <i>Does sense of coherence moderate the relationship between active problem coping and perceived stress? .....</i>                  | <i>74</i> |
| <i>Does sense of coherence moderate the relationship between passive problem coping and perceived stress? .....</i>                 | <i>75</i> |
| ARE THERE ANY DIFFERENCES BETWEEN STRESS LEVELS OF MEDICAL AND NON-MEDICAL STUDENTS AT THE SELECTED SOUTH AFRICAN UNIVERSITY? ..... | 75        |
| PRACTICAL IMPLICATIONS .....                                                                                                        | 76        |
| CONCLUSIONS.....                                                                                                                    | 79        |
| LIMITATIONS OF THE CURRENT STUDY AND DIRECTIONS FOR FUTURE RESEARCH.....                                                            | 81        |
| <b>REFERENCE LIST .....</b>                                                                                                         | <b>83</b> |
| <b>APPENDICES.....</b>                                                                                                              | <b>95</b> |
| Appendix A: Participant Information Sheet.....                                                                                      | 95        |
| Appendix B: Biographical Questionnaire .....                                                                                        | 96        |
| Appendix C: Stress Coping Style Inventory .....                                                                                     | 97        |

|                                                     |     |
|-----------------------------------------------------|-----|
| Appendix D: Orientation to Life Questionnaire ..... | 101 |
| Appendix E: Perceived Stress Scale .....            | 104 |
| Appendix F: Ethics Clearance Form.....              | 105 |
| Appendix G: Ethics Certificate.....                 | 114 |
| Appendix H: Normal Q-Q Plots.....                   | 115 |

## **LIST OF TABLES**

Table 1: Demographic Characteristics

Table 2: Descriptive statistics of the Main Variables

Table 3: Normality statistics of the Main Variables

Table 4: Reliability of Instruments and Subscales

Table 5: Correlations of Perceived Stress and components of Sense of Coherence

Table 6: Correlations of Perceived Stress and subscales of Stress Coping

Table 7: Correlations of Perceived Stress and full scale of Sense of Coherence and components of Stress Coping

Table 8: Moderation: Sense of Coherence on Active Emotional Coping and Perceived Stress

Table 9: Moderation: Sense of Coherence on Passive Emotional Coping and Perceived Stress

Table 10: Moderation: Sense of Coherence on Active Problem Coping and Perceived Stress

Table 11: Moderation: Sense of Coherence on Passive Problem Coping and Perceived Stress

## **LIST OF FIGURES**

Figure 1: Transactional Theory of Stress and Coping (Lazarus and Folkman, 1987)

Figure 2: Antonovsky's Salutogenic Theory

Figure 3: The Moderating role of Sense of Coherence

Figure 4: Confirmatory Factor Analysis for Stress Coping Inventory, Model 1

Figure 5: Confirmatory Factor Analysis for Stress Coping Inventory, Model 2

Figure 6: Interaction Plot for Sense of Coherence, Perceived Stress and Passive Emotional Coping

Figure 7: Interaction Plot for Sense of Coherence, Perceived Stress and Active Problem Coping

Figure 8: Interaction plot: Sense of Coherence, Perceived Stress and Passive Problem Coping

Figure 9: Normal Q-Q Plots for Active Emotional Coping

Figure 10: Normal Q-Q Plots for Passive Emotional Coping

Figure 11: Normal Q-Q Plots for Active Problem Coping

Figure 12: Normal Q-Q Plots for Passive Problem Coping

Figure 13: Normal Q-Q Plots for Perceived Stress

## CHAPTER 1: INTRODUCTION

There is substantial evidence globally, that students at universities experience an inordinate degree of study-related stress (El Ansari & Stock, 2010; Silver, 2013; Vally, Cody, Alsheraifi, & Albloshi, 2018). More than eighty percent (80%) of graduate students at different universities worldwide reported that they had experienced stress at some point during their studies (Naidoo, Van Wyk, Higgins-Opitz, & Moodley, 2014; Rummell, 2015). In South Africa, a high prevalence of stress levels which ranges from 65.5% to 90% was reported among university students (Govender, Mkhabela, Hlongwane, Jalim, & Jetha, 2015; Naidoo et al., 2014). Academic stress has a potential impact on university students' academic performance, mental health, cardiovascular functioning and drop-out and suicide rates. The South African Depression and Anxiety Group (SADAG) reported numerous suicide cases resulting from university related demands in 2018 (Health 24.com, 2016). Research has indicated that the students' Sense of Coherence (SOC) and their choice of coping strategies determine how they perceive and react to university demands (Ryan & Ryan, 2013; Silver, 2013).

SOC influences university students' choice of stress coping strategies, which in turn impact their stress levels (Antonovsky, 1993; Silver, 2013). It was hypothesised that SOC moderates the relationship between stress and the four components of stress coping strategies: Active Emotional Coping (AEC), Passive Emotional Coping (PEC), Active Problem Coping (APC) and Passive Problem Coping (PPC). A huge percentage of students at a selected South African university (in Johannesburg), like many other university students, experience high levels of stress (Friedman, 2014; Providas, 2016). There is need to examine the relationships that exist between the students' Perceived stress, SOC and the components of stress coping strategies they use at that selected university. This would not only assist in minimising the dire consequences of stress but will also inform the designing of stress preventative and treatment interventions in universities (Silver, 2013).

An individual's SOC, which is also known as generated resistance resources (GRRs) develops until the age of 30 (Antonovsky, 1993). It enhances students to perceive academic demands as meaningful, manageable and comprehensible.

The strength of a student's Sense of Coherence influences how one can cope with university stressors. Since most students fall under the developmental phase of SOC, it is crucial to find ways of improving their Sense of Coherence and coping mechanisms which have a great impact on their stress levels (Ryan, 2013; Silver, 2013). Moreover, there is a need to examine how stress is related to SOC and stress coping strategies in order to inform those involved with the students' wellbeing.

High stress levels among university students can disrupt the fundamental role that tertiary education has on stimulating the South Africa economy (Mason, 2017). Tertiary education empowers people with knowledge, skills and attitudes for the 21<sup>st</sup> century workplace. Students at South African universities face unique challenges due to historical changes in their education system, language barriers, foreign customs and unfamiliar cultures such that their stress levels become elevated (Friedman, 2014). Psychological stress among students has been a subject of many investigations (Friedman, 2014, Providas, 2016, Naidoo et al., 2014). Investigating the relationships among these students' Sense of Coherence, stress coping strategies and Perceived stress would assist in the adoption of stress reduction measures and would ensure the health and psychological well-being of students (Freidman, 2014; Providas, 2016).

Psychological discomfort in students is manifested in several ways including suicidal behaviours, anxiety, stress, depression and sleeping disorders, which socially and psychologically impact their behaviour (Mason, 2017; Saleh, Camart, & Romo, 2017). In the pursuit of an academic qualification, students are faced with university demands which include intrapersonal and interpersonal issues, academic under-preparedness, financial costs and difficulties in balancing personal and academic life (Lewin & Mawoyo, 2014; Van der Merwe et al., 2016). If these demands are not managed and balanced properly, they can lead to high levels of stress.

Moreover, if stress becomes excessive, it has a potentially negative impact on individuals' health, mental state, and academic performance (Ahern & Norris, 2011; Lazarus & Folkman, 1987; Providas, 2016).

A study done in Canada on students' stress levels at tertiary institutions in 2015, reported that 46% of the students had their academic performance impacted as a result of stress and 53% of the students experienced sleep difficulties due to stress (Versaevel, 2014). Therefore, students need to be equipped with a stronger Sense of Coherence which will assist them in choosing coping strategies that can reduce their stress levels (Ryan & Ryan, 2013; Silver, 2013).

Academic psychological stress which comes as a result of a taxing university life also influences students' sense of wellbeing, self-confidence, mood and behaviour (Schneiderman, Ironson, & Siegel, 2005). It can lead to detrimental results, if inappropriate coping strategies are adopted. Students who use passive coping strategies such as self-blame and avoidance coping strategies can end up with reduced concentration, decreased attention and compromised decision-making behaviour. For instance, in another study, it was established that stress reduced the medical students' ability to initiate and establish proper and stable relationships with their patients and this might result in the students feeling unsatisfied and inadequate in future clinical practice (Schneiderman, Ironson, & Siegel, 2005).

Academic training has been mentioned by several researchers as one of the causes of psychological stress (Friedman, 2014; Providas, 2016). Individuals who fail to cope with stress, may end up suffering from cardiovascular diseases (CVDs) which have been predicted to be one of the leading causes of disability, death, and high medical costs globally by 2020 (Hu et al., 2015). Researchers have hypothesised that psychological stress is one of the major causes of hypertension (Hu et al., 2015). It is estimated that hypertensive adults will increase to 1.5 billion, which is 30% of the world's population, if stress reduction measures are not introduced (Hu et al., 2015). Understanding the factors

associated with high stress levels in a university setting would reduce the students stress levels, which would minimise its health consequences.

Most university students strive to meet their institutions' high standards and there is a greater risk of exposure to stressful academic demands (Naidoo et al., 2014).

If they fail to cope with academic demands, students become stressed and feelings of fear, uselessness, aggression, incompetence and anger may be aroused. Their level of individual factors such as Sense of Coherence and choice of stress coping strategies may cause some students to struggle in managing their stress levels, making an intervention necessary (Naidoo et al., 2014). Examining factors which influence high stress levels is crucial as this has an impact on designing measures for alleviating negative consequences of stress and promoting a healthy training and studying environment (Bezuidenhout & Cilliers, 2010; Maturure, 2016).

University life has different aspects which require proper time management skills, and students are also required to consolidate personal and professional identities which can make life more stressful (Estevez, 2010). University students also have pressure from high parental expectations, the pressure to earn good grades, excessive coursework, financial problems, social issues, and worries of the future which increase their stress levels (Estevez, 2010; Ryan & Ryan, 2013; Wilks, 2008). Furthermore, some of them find the transition from high school; an environment which is familiar, to university; an environment which is unfamiliar and full of many new demands very stressful (Estevez, 2010). Under-preparedness and the absence of proper coping skills to deal with stressors in tertiary education, impacts on stress levels (Hodge-Window, 2017; Zemirah, 2000). Having adequate knowledge of factors which can reduce the impact of academic-related stressors would be of great benefit to them.

Moreover, some students may be poorly informed and choose to join professions under false perceptions, leading to more stress (Münstedt, Harren, von Georgi, & Hackethal, 2011). For instance, some of the medical students might have chosen to join the medical

field after watching doctors on television and underestimated certain stressful training tasks they need to perform before qualifying (Münstedt et al., 2011). In medical schools, students are expected to consider their sensitivity to human anatomy and the smell of human body parts, chemicals like formaldehyde and their reaction to the dissection of human bodies before enrolling.

Although some students can get used to these stressful environments, some cannot endure these demands without feeling sick, and this can elevate their stress levels (Sándor, Birkás, & Gyórfy, 2015). To create awareness of the stress coping mechanisms, students can adopt and make them ready to face the demanding course requirements. An examination of how these coping resources are related to stress is crucial.

Most universities in South Africa or elsewhere offer a range of courses which varies in their degree of complexity. To minimise academic-related stress, the selected university has a unit for career counselling development (CCDU) which caters for students who are going through difficulties in their personal and academic life. The unit has experienced counsellors and psychologists who provide counselling, therapy and referral services. The university also has advanced facilities aimed at producing knowledgeable, skilled, competent and qualified medical professionals who can render comprehensive healthcare services in South Africa (Naidoo et al., 2014).

Several researchers found that attending medical school is more complex and stressful than attending other schools (Salam, Yousuf, Bakar, & Haque, 2013). For instance, in an international study, it was established that medical students had high levels of stress than non-medical students (Sohail, 2013). A number of studies conducted in South Africa focused on the prevalence of stress, depression, burnout and substance abuse among students (van Zyl et al., 2017). However, there is limited literature to justify that medical students are more highly stressed than non-medical students such as psychology students; hence there is a need to compare stress levels of medical students and non-medical students in the South African university context. Moreover, stress levels depend

on several factors, which further emphasises the need to cover this gap, since these factors can make a big difference in the results (Gopi, Pradeep & OC, 2018).

Furthermore, evidence has proved that, apart from the complexity of the course requirements and the learning curriculum, the university environment, individual factors and social support can also impact the students' stress levels (Gopi, Pradeep, & OC, 2018).

Therefore, comparing the differences in stress levels of medical and psychology students would indicate whether the perceived complexity of medical school suggested by other universities, might also be applicable to this multinational, multi-cultural and multi-religious South African university.

Additionally, there is a growing concern about mental health issues among universities (Castillo & Schwartz, 2013; Milojevich & Lukowski, 2016). In South Africa, suicide and drop-out rates are escalating despite the mental health promotion interventions offered by universities. Past research has focused on examining the relationship between coping strategies and Perceived stress (Vally et al., 2018). There is limited literature on the moderating effects of SOC on stress and components of stress coping strategies at universities within the multicultural, multi-lingual, democratic context of South Africa. Therefore, it is crucial to add to this literature.

This study aims to examine the moderating role of SOC and investigate the relationships that exist among Perceived stress, SOC and the four components of stress coping strategies (AEC, PEC, APC and PPC). It also aims on comparing stress levels between medical and psychology students to find out if there are differences between medical and non-medical students as suggested by previous researchers.

## **CHAPTER 2: LITERATURE REVIEW**

This chapter will conceptualise stress, coping strategies and SOC. Relationships among these three variables in a university setting will be examined. This warrants the need to explain the meanings of the variables and the importance they have in the South African context. Literature will be reviewed on each construct. It is crucial to conduct a literature review when embarking on a research project; to establish the context of the research problem. This chapter also describes the theoretical framework for the research that justifies the significance of a research (Hewstone et al., 2018). The theoretical framework also gives a description of a phenomenon which is supported by evidence and based upon a hypothesis (Nederman, 2015). Additionally, a detailed overview of previous research on the three constructs and relevant theories will be presented (Leedy & Ormrod, 2013).

### ***ACADEMIC PERFORMANCE***

While optimum academic performance is the primary focus of most universities, it is important to acknowledge that some university students still fail to achieve their academic goals. Most university students try to work to their level best in a bid to attain the best results and they also strive to maintain good grades (Friedman, 2014b). Academic performance in universities comprises of academic success or achievement, acquisition of skills, knowledge and competencies, retention and persistence (York, Gibson, & Rankin, 2015). It is the student's responsibility to accomplish academic tasks which are measured against preset and known standards of completeness, accuracy, speed and cost (Abubakar et al., 2018). The student's academic success is an outcome that is indicated by the academic work quality and grades (Gibson & Rankin, 2015). It is related to a student's performance with regards to acceptable marks, the attainment of a qualification or a degree and the retention of life skills and a career which gives an opportunity for professional development and employment (Brausch & Decker, 2014).

In the South African context, academic performance is influenced by several factors which include a large spread of cultures and customs, exposure to several language barriers (since some students move from a rural to an urban environment) and large class sizes (Providas, 2016). It is crucial for universities to ensure that obstacles are minimised to encourage students' attitudes and positive feelings towards their studies (Friedman, 2014). This would also inspire students to invest more energy, time and effort to effectively concentrate on their academic goals and face university challenges (Hawley, Cabrera, Milem, & Marx, 2012).

Reports from the South African Business Day News indicated that the Department of Higher Education estimated that 47.1 percent of university students failed to complete their degrees in 2015 (Providas, 2016). Furthermore, in 2019, only 22% of South African university students completed their three-year degrees within three years despite the improvement in the throughput (BUSINESS TECH, 2019). To add more, the drop-out rates in the South African tertiary institutions are escalating while retention rates are decreasing (Du Plessis & Gerber, 2012; Friedman, 2014a; Providas, 2016; Rogan, Radlinger, Portner-Burkhalter, Sommer, & Schmidtbleicher, 2013). A study conducted in South Africa, established that 40% of first year students dropped out due to academic demands, family responsibilities, financial problems and lack of the feeling of belonging in the university environment (Pather, 2019).

Past research indicated that fifty percent of registered students in year 2000 had dropped out by 2003 (Jama, Mapesela, & Beylefeld, 2008). One of the factors leading to the increase in dropout rates and increase in low pass rates is psychological stress. To support this claim, a South African study found that 78% of medical students were stressed (Naidoo et al., 2014). Considering the high drop-out rates and low pass rates, it became critical to examine factors that hinder expected academic performance (Ahn, Park, Baek, & Chung, 2007).

Academic performance is predicted by many factors which includes gender, personality traits, health status, academic life satisfaction, high school grades, number of studying

hours, approach to learning, social support, motivation, socio-economic status and employment status (Asani & Usman, 2018).

Academic stress was also identified as one of the factors that predicts academic performance (Duncan, Freidenreich, Chinn, & Bausch, 2011).

## ***ACADEMIC STRESS AND UNIVERSITY STUDENTS***

Stress can make a university student's life more challenging. However, there are levels of stress that are acceptable (Bartlett & Knoblock, 1988) . If stress is persistent, ongoing, and excessive, it impacts adversely on mental and physiological health (Bartlett & Knoblock, 1988; Bugaj et al., 2016). To function optimally, students need a stable environment. A stressful environment would negatively impact their academic performance and well-being (Chan, Creedy, Chua, & Lim, 2011). Excessive stress can lead to vulnerability to depression, suicidal thoughts, stomach ulcers, cardiovascular disease as well as hopelessness (Friedman, 2014).

According to Seyle (1936) cited in Kennard (2008), stress is whereby an individual experiences a psychological imbalance which results from the inconsistencies that can happen between the individual's motivation, perceived ability and situational demands. Stress was adopted as a psychological concept which explain how a body respond to any demands (Akram, Mohamad, Meerah, ZamZam, & Abdullah, 2012; Kennard, 2008). University students may experience elevated levels of stress in their daily life due to maintaining personal relationships, being acclimatised to a new environment, grade competition, social adjustment and increased complexity of the learning material (Negga, Applewhite, Livingston, 2007; Ryan, 2013). Some university students perceive the academic pressures as a challenge which motivates them to work harder, while some students find it difficult to cope with (Delport, 2018).

There is a prevalence of severe mental illness and stress among university students in African countries other than South Africa (Stoddard, Urban, & Schmeiser, 2017). In

Ghana, a study conducted at a local university which used the Perceived stress Scale found that 70% of first year students reported moderate stress levels, 3.5% high stress levels while 25% reported low stress levels (Amponsah & Owolabi, 2011).

Results from another study in Botswana, showed that 88% of students found it difficult to concentrate due to stress at some point during their studies (Amponsah & Owolabi, 2011).

In South Africa, higher education is unique and different from other countries in that attendance is increasing since the fall of the apartheid era (Stoddard, 2017). Universities are enrolling more students as compared to previous years and they must deal with a higher level of diversity (Lee & Graham, 2001). Retention and graduation remained low although enrolment increased (Stoddart et al., 2017). This is most common among students from poor and rural backgrounds, and historically disadvantaged students (Stoddart, 2017). Students are facing demands due to language barriers, personal problems, difficulties in understanding the content, communication and curriculum workload problems (Naidoo et al., 2014). Students are facing a variety of stressors which includes being uncertain of the future, work overload and having difficulties with the process of being integrated into the system (Naidoo et al., 2014).

Some students find the gap between high school and college so difficult such that they become extremely stressed (Lee & Graham, 2001). The difficulties they face physically, socially and emotionally affect their academic performance and their learning ability (Chew-Graham, Rogers, & Yassin, 2003). Therefore, university authorities need to be better informed so that they can implement effective programmes to reduce stress levels and promote students' well-being.

Research has indicated that medical students have a perception that they are more likely to become ill as compared to other students (Shaikh et al., 2004). This could be due to the commonly held belief that medical school is very challenging. Lee and Graham (2001) explained that university level is inherently stressful, especially at the medical school.

They view it as more demanding due to work overload which takes away relaxation time for the students, the time to engage in recreational activities and deprives them of sleep. Medical students suffer from impaired judgement, reduced concentration, increased anxiety, loss of self-esteem and depression which come as a result of stress (Hj Ramli, Alavi, Mehrinezhad, & Ahmadi, 2018; Mouret, 2002).

However, there is limited literature which has compared medical students' stress levels to students attending other schools, hence the significance of this study.

### **An overview of stress**

The difficulties and tension university students experience as they face different study programs, takes them through different kinds of stress (Lemus-Cruz, González-Pérez, Sánchez-Orozco, Iñiguez-Soto, & Castellanos-Franco, 2017). Hans Seyle, who is considered as the father of all stress theories, examined social factors which determine stress (Kennard, 2008). The modern society's stress levels were found to be associated with factors such as marital disputes, excessive responsibility, unemployment, the traffic, children's education, economic difficulties and academic training (Lemuz-Cruz et al., 2017).

In 1956, Seyle mentioned that stress consists of all nonspecific changes resulting from function or damage, or the rate of tear and wear in the body. Stress make people do things when they need a push, change people's mindset and make them feel that they need to seek solutions to problems (Baqtayan, 2015). Stress can be defined as the work of environment (Smith, 1990). Vulnerability to stress is more prevalent in people whose work involves interaction with other people than those who are product-oriented (Marshall & Cooper, 1979). Stress can be best understood as a result of the social interaction between the environment (for example the university climate), the nature of the stressor (for example difficulties in understanding course learning material) and the individual's vulnerability (for example the strength of the SOC and the choice of coping strategies, social support) (Baqtayan, 2015).

In a university setting, stressors include a variety of demands in the student's academic life, which can implicate them socially, psychologically and physically. If students fail to cope with these demands, it can result in adverse consequences which can negatively impact their academic performance, which is the main objective of university education. Naidoo et al., (2014) explain that academic stress occurs when individuals fail to cope with perceptions of the present or future situation.

They further added that stress impacts the cognitive functioning and learning abilities (Naidoo et al., 2014). Stress was categorised into two different sections; the favourable stress, which facilitates performance and unfavourable stress, which can have devastating results (Lin, Wenbo & Bing, 2005).

### **Components of stress**

Stress has a variety of dimensions which include affective, cognitive, behavioural and physical dimensions, be it in an organisational or a university context (Saleh et al., 2017). The cognitive dimension includes the individual's thought processes as a result of cognitive manifestations (Saleh et al., 2017). It involves organisation, concentration and clarity of thought, time management, focus and the ability to remember.

The affective dimension involves emotions which can be affected by stress (Saleh, 2017). This can include rapid mood swings, irritability, sadness and unpredictable anger. The behavioural dimension of stress includes absenteeism, drug abuse and alcohol which result from the behavioural changes which are linked to stress (Saleh, 2017). These affect relationships and positive interactions with others. Finally, the physical dimension of stress involves negative effects of stress that can manifest as changes in sleep patterns and appetite. Some people can even gain or lose weight while some can have health issues including ulcers and high blood pressure.

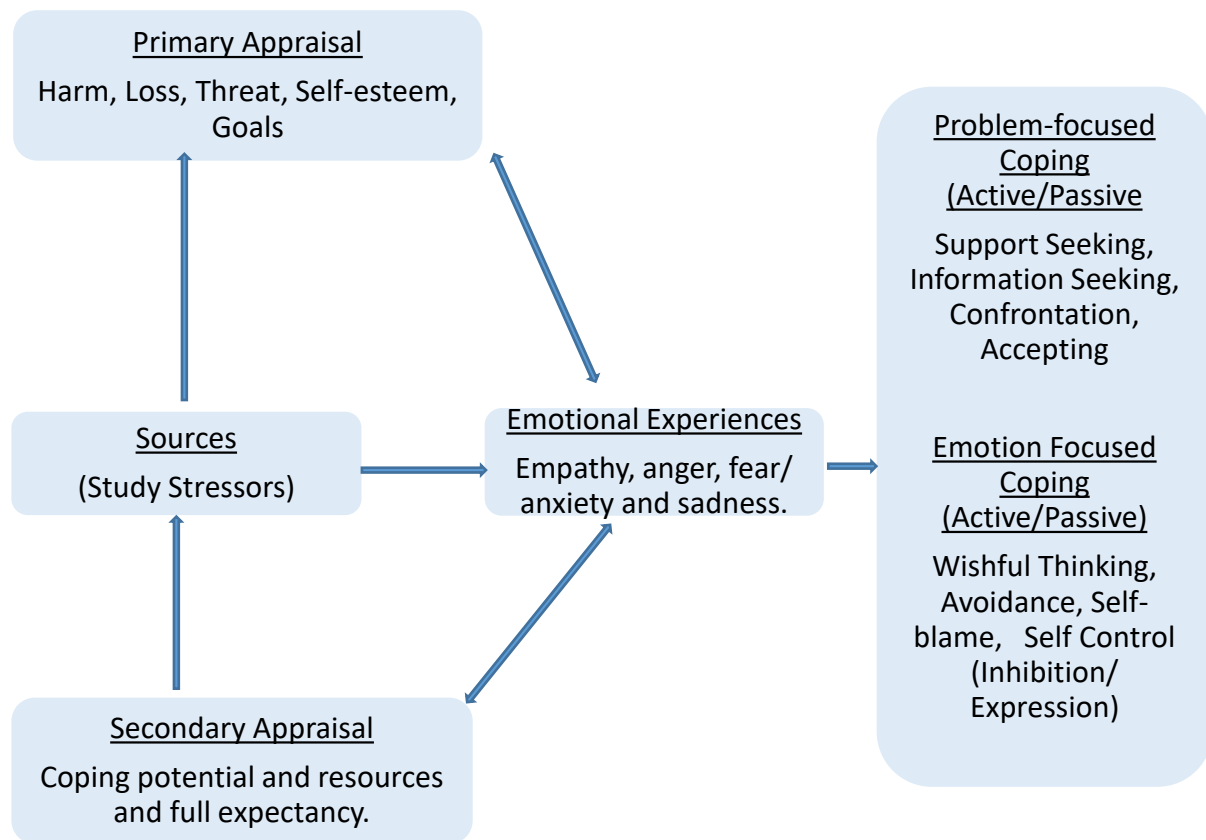
## Models of stress

Models of stress propose that the systems in organisations interact with its broader economic and social environment, and this is the case even in university settings (Keady, 1999). Universities have systems which can affect students socially and economically. Students experience a great deal of stress, in relation to achieving emotional independence from the family, developmental tasks, choosing and preparing for a career, developing an ethical system and preparation for commitment to relationships and family (Keady, 1999).

Some students change living conditions or residence, some are faced with decisions on alcohol use or drug use or sexual behaviour, while others change the type of social activities they participate in (Keady, 1999). Most stress models describe general stress models which includes stressors, moderators and outcomes.

The current study will focus on the Transactional Model of stress by Lazarus and Folkman (1987), which includes stress and coping. This model is appropriate in a university setting because it incorporates how students interact with their university environment, how they perceive or appraise their university demands, and how they will choose their coping strategies. Some students perceive university demands as meaningful challenges that are worth of investment and hence choose active coping strategies (for example, seeking for social support) which can be either emotion-focused or problem-focused. Other students perceive university challenges as threats meant to cause harm and they tend to choose passive coping strategies (for example avoidant coping) which can be either emotion-focused or problem-focused. Figure 1 shows the Transactional Theory of stress and coping by Lazarus and Folkman.

*The Transactional theory of stress and coping (Lazarus and Folkman, 1984)*



*FIGURE 1: Adapted from Poirel and Yvon (2016)*

The Transactional Theory of Stress and Coping which will guide the study, it is regarded as one of the first stress and coping models (Biggs et al., 2017). The model describes stress as an outcome of the interaction that occurs between the environment and the individual. It places an emphasis on appraisal to evaluate threat, challenges and harm, which necessitate the coping process and are triggered by stressful events (Nilson, 2008). The Transactional Theory of stress and coping combined and connected stress and coping and describes how the two influence each other, which makes the theory suitable for guiding this study. This theory is applicable in many settings, including a university setting.

The university environment is surrounded by many challenges such as the difficulties in handling the workload and understanding the learning material and financial problems. Lazarus and Folkman (1987) developed the Transactional Theory of Stress and Coping that emphasizes the fundamental role of perception (Biggs, Brough & Drummond, 2017). They mention that different individuals might interpret the same situation differently, what one interprets as a threat can be interpreted by another one as a challenge. University education can lead to a state of emotional and mental exhaustion, which result from academic demands and social factors and can elevate stress levels as suggested by the Transactional Theory (Lemus-Cruz et al., 2017).

Academic demands trigger the coping process, which will determine the students' stress levels. Due to individual differences (for example differences in the strength of students' Sense of Coherence and choice of coping strategies), students can perceive these challenges as threats or harmful. Appraisal of the situation determines an individual's levels of stress which manifest in the form of feelings, thoughts, behaviours and emotions as a result of external stressors (Lazarus & Folkman, 1987). The way students perceive academic challenges determine their choice of coping strategies which impact on their stress levels.

Psychological stress is an emotional response resulting from environmental stimuli or events which could compromise an individuals' wellbeing and be experienced as greater than an individual's resources (Lazarus & Folkman, 1987). Stress can be a result of internal perceptions or processes, or external environmental stimuli. Major life events and daily hassles result in stress (Berjot et al., 2017). Lazarus and Folkman (1987) define major life events as environmental or natural and as the ones that are unforeseen and unpredictable and beyond an individual's control. They go on to describe another type of major life event which is beyond an individual's control and happens infrequently, for example death of a loved one, disability, divorce and sickness.

Experiences that result in annoyance, irritation and ultimately in feeling overwhelmed by responsibilities and in feeling distressed are called 'daily hassles'. These include having an

argument, money and family problems (Biggs et al., 2017). Daily hassles happen frequently and are excellent predictors of psychological and physical symptoms. Stress results in anxiety, and leads to changes in behaviour, depression and physiological changes, which could be either acute or chronic. According to Biggs et al., (2017), the Interactive Model views that an individual passes through two different processes which are:

- a) Cognitive assessment, which is the extent to which the situation relates to the individual and
- b) How the problem is dealt with, which refers to the attempt to find a solution, tolerate or reduce the external and internal pressures.

As indicated in Figure 1, the cognitive assessment process has two stages, the primary and secondary assessment. Primary assessment happens when the individual assesses the importance of the event and gives a meaning to it or an evaluation of its importance and concludes whether the encounter is appropriate or stressful, and if there is potential harm or benefit. Secondary assessment occurs when the individual assesses his/her available resources for dealing with the event in relation to coping resources and what can be done. Stress occurs when demands of events surpass available resources and is moved by the emotional response to threat and harm (Matthieu & Ivanoff, 2006). The appraisal has two functions which includes changing the person-environment relationship and determining the levels of emotional distress (Berjot et al., 2017).

During the secondary assessment, individuals make use of their GRRs (SOC) or resources at their disposal to deal with stressful events. Individuals with a strong SOC tend to adopt active coping strategies which result in low stress levels while those with a weaker SOC are likely to choose passive coping strategies which elevate stress levels. It is during this stage that stress, stress coping strategies and SOC become intertwined and linked. The Transactional Theory of stress managed to combine stress and stress coping strategies in a way that suits this study. Therefore, this study is guided by two theories, the

Transactional Theory of stress and the Antonovsky's SOC Theory, which is also known as the Salutogenic model (Antonovsky, 1993).

However, there are several theories which can be used to support the Transactional Theory of stress. The General Adaptation syndrome (GAS), Schwarzer and Colleagues' Proactive Coping Theory; and Aspinall and Taylor's Proactive Coping Theory will be used to understand the concepts of the study. These theories could not be part of the theoretical framework because they do not address the SOC concept adequately.

*The general adaptation syndrome (GAS) (Seyle, 1936)*

According to Kennard (2008) the General Adaptation Syndrome (GAS) is a stress model which was developed by Seyle in 1936, to explain the body's physiological response to stress. The GAS demonstrates how the body responds biologically and how it adapts to available stressors. The responses were divided into three stages: The Alarm Reaction Stage, The Resistance Stage and The Exhaustion Stage.

The *Alarm Reaction* consists of an early shock stage and a consequent counter shock stage. Seyle (1936) explains that individuals react to stress by activating their defence mechanisms to deal with or escape from the stressor when responding to an external stressor. During the *Resistance Stage* individuals find ways of coping by trying to reverse the alarm stage. The individual is continuously exposed to the stressor until energy is depleted and exhausted during the *Exhaustion Stage*.

Seyle (1956) as cited by Kennard (2008) argues that stress is a biological process created by social influences. He goes on to explain that stressors are a result of the environment (physical and psychosocial) which result in individual reactions (coping strategies). Cognitive processes that are built on social learning (for example, SOC) can moderate individual reactions.

Many stress researchers, historical and present, viewed that biological developments of stress can be traced back to Seyle's GAS theory of 1936 (Jackson, 2017). Historians believed that Seyle's article constituted a turning point in the history of stress and claims that he is the creator or father of stress (Jackson, 2017).

Regardless of this support, in 1951 Edward C Kendall openly dismissed "the adaptation syndrome of Selye" claiming that it explains the influence of cortisone on health and disease (Jackson, 2017). However, Jackson (2017) argues that in spite of 'Kendall's curt rejection of Seyle's work and criticism from other scholars, Seyle's stress theory is highly considered by scholars around the world and still regarded as one of the key tenants of modern endocrinology, because many stress authors are using his work as a reference.

Seyle's GAS theory can also be applied to a university context since it included factors such as demands, response of the body and psychological imbalance which are relevant to university students. Students respond to academic stressors, the same way the GAS theory illustrates. However, the GAS theory is not as comprehensive and detailed as the Transactional Theory of stress and coping. It does not explain how an individual's interaction with different kinds of stressors and the environment is appraised. Moreover, the Transactional theory details how coping strategies are chosen and determined. The Transactional theory of stress and coping's influence continue to be the cornerstone or foundation of psychological stress and multidisciplinary research (Biggs et al., 2017). Mitrousi, Travlos, Koukia and Zyga (2013) added that the relevance of this theoretical model is indicated by the fact that no different approaches to issues of stress and coping have been suggested.

## ***COPING STRATEGIES AND UNIVERSITY STUDENTS***

Students use different types of coping strategies which vary depending on the supportive network, the academic year of study and source of stress (Kadziolka, Di Pierdomenico, & Miller, 2016). These strategies to manage stress are categorised under personal engagement and disengagement. Engagement focused strategy that students use

includes, social integration, positive thinking and emotional expression to reduce anxiety and depression. Disengagement strategies include problem avoidance, self-criticism and social withdrawal and result in poor mental and physical health.

Strumpfer (2012) views the way people cope with stress as being determined by individual characteristics such as SOC. Active coping strategies such as support from tutors, peers and family assist individuals in dealing with stressful events. Social support has indicated therapeutic benefits in helping people cope with stress (Strumpfer, 2012). Results from previous studies have shown that students' stressors include difficulties in communicating, workload issues related to the academic curriculum and personal problems (Kadziolka et al., 2017).

Students can cope with events which are negative in three different stages which are: a) primary appraisal of the situation and becoming aware of possible threat; (b) Secondary appraisal which involves becoming aware of the potential responses that can be made; (c) Coping or execution of coping responses as indicated in Figure 1 (Struthers, Perry, & Menec, 2000). They use different types of coping strategies which include problem focused coping (either passive or active). This involves thoughts, actions and strategies geared towards removing or diminishing events that are stressful or the effects thereof. They also include emotion-focused coping (either passive or active), which involves strategies, actions and thoughts directed towards managing and reducing emotions that are distressing and associated with threatening events (Lin & Chen, 2009).

### **An overview of coping strategies**

Coping can be described as an individual's effort to assess and evaluate negative stimuli (Mitrousi et al., 2013). Deasy, Coughman, Pironom, Jourdan, and Mannix-McNamara (2014) view coping as a process which minimises, reduces, or tolerates stress and prevents psychological distress. These scholars describe coping as cognitive and emotional efforts done by individuals to deal with the internal and external challenges of

the situation at hand. They continue to say it is seen as a process as opposed to an outcome or a trait.

Lazarus and Folkman (1984, as cited by Kim, 2017) both view coping as an association between individuals and factors around them. They point out that coping is influenced by social functioning, somatic health and subjective well-being.

From one time to another the association between individuals and the factors around them change continuously, for example students go through complex stages of examination which include a warning period, an exam or confrontational stage and a period for waiting results. These stages require coping strategies which are different (Lazarus, 1993).

### **Components of Coping Strategies**

The first of component of these coping strategies is Emotion-focused coping, which regulates the emotional consequences of stress, and involves attempts to deal with an individual's emotional responses to a stressor through a cognitive reappraisal process such as self-reflection (Carver, 2011). It assesses the emotional response to the stressors and necessary emotions for expressing and processing, as a prelude to reappraising unchangeable stressors. Individuals choose emotion-focused coping with less controllable problems such as physical problems (TAYLOR, 2002). Emotion-focused coping strategies can be either passive or active (Lazarus & Folkman, 1984, Taylor, 2002).

Active coping strategies (behavioural or psychological) are responses that are meant to change the qualities or nature of stressors or how individuals perceive it (Baker Jr, 2013). They are thought to be an effective and a better way of dealing with stress (Holahan & Moos, 1987; Taylor, 1998). Passive coping strategies, also known as avoidant coping strategies, are used when people are keeping away from directly addressing stressful events, this include activities such as alcohol use and mental states such as withdrawal behaviours (Taylor, 2002; Lazarus & Folkman, 1984). Passive coping strategies are a

psychological risk factor, prone to adverse responses to events that are stressful (Holahan & Moos, 1987).

A second component of coping strategies is problem-focused coping which focuses on attempts to modify and change the vital sources of stress and includes applying information seeking or formulating strategies to prevent the sources of the stress (Baker, 2013). The main aim is to minimise or remove the sources of the stressor and then the individual will be taking control of their relationship with the stressor (Lazarus, 1991).

Problem-focused coping strategies are efforts used to alleviate stressful circumstances. They are normally used when individuals are dealing with potentially controllable problems (Taylor, 2002). Problem-coping strategies can also be either active or passive just like emotion-focused coping.

### **Types of coping strategies**

Coping strategies can be either adaptive (constructive) or maladaptive (non-coping strategies). Adaptive coping strategies are positive techniques for dealing with stress that can improve functioning (Stanton et al., 2000). They enhance resilience, which is the ability to recover quickly from difficulties. They reduce anxiety and manage future responses to the same stimulus or stimuli (Thwaites & Freeston, 2005). They have a long-term impact and they include anticipation, seeking social support, meaning-focused coping and exercising. Having knowledge of, or knowing how to apply them assists in promoting wellness in universities. If universities are successful in academic performance and ensuring students' wellness, then individuals and societies will be able to function properly.

Maladaptive or non-coping strategies are negative techniques to minimise symptoms without changing the disorder; making it stronger. These are quite effective in the short-term rather than being long-term coping processes. Examples of these techniques are dissociation, social withdrawal, overcompensation, sensitisation, safety behaviours, anxious avoidance and escaping medication. Coping with psychological stress is a

challenge to some university students such that they resort to using stimulants to reduce university studying difficulties and demands.

### **Factors influencing coping skills and coping abilities**

Coping is determined by the personality type, either Type A or Type B. Type A personality is associated with competitiveness, high values and excessive drive.

It includes high achievers and ambitious people who can cope with high work overload with low stress levels (Lazarus & Folkman, 1984; Kim, 2017). Type B individuals are relaxed, reflective, easy going and social. They have difficulty coping because they feel that they are not in control.

Lazarus and Folkman (1987) stated that the social environment can offer both support and stress to an individual. A strong social network can offer direct aid to an individual, emotional support and services, advice and information while people who feel geographically isolated, without close relationships are prone to have negative emotional responses and lower coping strategies.

### **Models of coping strategies**

#### *Aspinwall and Taylor's Proactive Coping Theory (1997)*

Proactive coping is where an individual prepares for potential future stressors by making efforts in advance, to prevent or modify a stressful event before it happens (Aspinwall & Taylor, 1997). According to their theory there are three types of coping, namely reactive coping, anticipatory coping and proactive coping. Reactive coping focuses on tolerating, mastering, reducing and minimising environmental or intrapsychic demands and results from harm, threat and loss experiences. Anticipatory coping is preparing for consequences of likely or certain future events, which are stressful. Proactive coping includes acquisition of resources and skills, not designed for any stressor and it occurs

temporarily before anticipatory and reactive coping. Proactive coping prepares for potential stressors and reduces their negative effects by developing skills prior to their occurrence.

Aspinwall and Taylor (1997) proposed a five-stage conceptual framework of Proactive coping which consists of the accumulation of resources, recognising possible or potential stressors, preliminary assessment procedures, initial coping efforts, elicitation and feedback usage.

They argued that, at the resource accumulation stage, a person prepares for the anticipated stress by building resources and skills such as time, social support and the establishment of a social network.

The recognition of potential stressors involves screening of the environmental dangers and arising threats. Several related characteristics relevant in the detection of potential stressors, includes vigilance, monitoring, sensitisation, repression, hyper vigilance and dispositional optimism. During initial appraisal or preliminary assessment, procedures for potential stressful interactions are identified by individuals. This also includes appraising the situation and coping efforts. Personality traits (self-efficacy, optimism, hardiness, anxiety, self-esteem, constructive thinking) and situational factors (perceived controllability) are key ingredients to the initial appraisal of proactive coping.

The use of feedback and elicitation involve initial coping efforts and the impact they have on the development of a specific stressful event. It is the final stage where an individual evaluates whether previous efforts were successful and the extent to which more coping strategies or efforts are needed. Both situational and personality factors, facilitate the use of feedback during this stage. For example, people who believe in their abilities may fail to recognise their personal limits and be unprepared to confront certain situations, which might increase their chances of failing rather than being successful. Social networks have been influential in the detection of warning signs, while perceived risks can either be reduced or increased through social networks.

### *Schwarzer and Colleagues Proactive Coping Theory*

This theory makes a distinction between reactive and proactive coping and preventative and anticipatory coping. It views that reactive coping focuses on past or events one must deal with presently or to compensate for loss or harm while proactive coping focuses on future events that are indeterminate. They explain that anticipatory events occur before a certain event is likely to happen with the purpose of managing threats, maximising benefits, attaining challenges or a combination of them.

Preventative coping focuses on efforts to establish general resistant resources that are meant to cope with an event, that may or may not occur in the future (Schwarzer & Taubert, 2002).

Proactive coping involves efforts to establish general resistance resources aimed at confronting challenging goals. Proactive copers evaluate life demands or stressors as challenges and worry less while preventative copers evaluate demands or stressors as threats and worry more (Greenglass & Fiksenbaum, 2009).

### *Conclusion*

Some individuals cope better than the others, depending on their personality and the stressful event which determines the coping strategies they choose (Lazarus & Folkman, 1987; Taylor, 1999). Sometimes the person-environment fit between students and the academic or social setting among South African Universities could be problematic, which might result in higher stress levels (Malefo, 2000). Therefore, a study to examine factors that determines elevated stress levels is crucial (Prillerman, 1989). This study focuses on the two components of coping strategies proposed by Lazarus and Folkman in 1987. These two components of coping strategies were further classified into four components, which are APC, AEC, PPC and PEC (Lin & Chen, 2009). These components of coping strategies were chosen because they try to summarize what other authors found but they are more specific.

## ***SENSE OF COHERENCE AND UNIVERSITY STUDENTS***

SOC is normally described as a health-promoting resource that usually develops before an individual reaches the age of 30. SOC development can be challenged by the multiple demands that students at universities face, such as financial difficulty and study-related stress (Chu, Khan, Jahn & Kraemer, 2016).

According to Mirza et al. (2009), SOC is associated with optimism, health behaviour and self-efficacy in university students.

It indicates a significant negative correlation with psychological distress but has a positive correlation with mental health among medical students (Mirza et al., 2009). They explain that students with a high SOC can successfully deal with university life problems while those with a low SOC have high chances of chronic work-related stress.

Coetzee and Oosthizen (2012) in line with Antonovsky (1993) had the view that students with strong beliefs that the world (in addition to their studies) make sense (comprehensibility), are most likely to perceive themselves as being equal to life challenges (manageability), when compared to students who perceive the world (including their studies) as an environment without rhyme or reason. They go on to explain that, students who do not prioritise the usefulness of commitment to their life activities or their studies (meaningfulness) are not likely to have motivation in participating in shaping events (such as writing an examination or studies) even if the environment is seen as manageable.

According to Maturure (2016), people with a stable or strong SOC have a higher probability of perceiving or comprehending the dimensions and qualities of a constantly recurring (chronic) stressor. They are also capable of re-weighing, re-evaluating or redefining it as something that does not require one to succumb to. They are more likely to avoid health endangering activities and threats and engage in health promoting

activities and select appropriate coping resources. A stronger SOC gives individuals the ability to employ affective, instrumental and cognitive strategies that are likely to increase their coping and wellbeing (Van der Colff and Rothmann, 2009). Therefore, students with a strong SOC are more likely to adopt health promoting coping strategies that assist them in dealing with academic stress in a positive manner.

An Individual's SOC may either moderate the effect of stressors on individual's affective outcomes or aggravate or alleviate reactions to a stressor (Muller & Rothmann, 2009). There is need to understand SOC in universities so that strategies for maintaining or increasing SOC levels can be developed.

Most previous research studies have demonstrated that students with a high SOC employ problem-solving strategies rather than avoidant coping (Amirkhan & Greaves, 2003). They have indicated that there is a significant correlation between the SOC and self-reported health of students (Chu et al., 2016; Bracha & Hoffenbartal, 2015; Coetzee & Oosthuizen, 2012). They also showed that students who have a high SOC reported better health than those with a low SOC. Subdivisions of SOC scale, manageability, meaningfulness and comprehensibility were significantly correlated with self-rated health (Rai, Sindhu, Dudeja, Sirohi, & Mukherji, 2018)

### **An overview of Sense of Coherence**

SOC is a core concept of Antonovsky's Salutogenic theory that focuses on the relationships between stress, coping and health (Maturure, 2016). It deals with the origins of health and well-being rather than disease. SOC is a construct which is at the centre of a human information-processing system (Antonovsky, 1987). It focuses on resolving conflicts and assists individuals to endure the inevitable stress (Bonacci, Vicenzino, Spratford, & Collins, 2014).

According to Antonovsky (1987, p.19), SOC is a "global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli, deriving from one's internal and external environments in the course of

living are structured, predictable and explicable; (2) the resources are available to one, to meet the demands posed by the stimuli and (3) these demands are challenges, worthy of investment and engagement. These three elements reflect the comprehensibility, manageability and meaningfulness component of SOC''. Those with a strong SOC perceive events in the world as manageable, comprehensible, meaningful and worth overcoming.

Taylor (2002) argues that stress levels can be determined by an individual's sense of mastery over his or her immediate environment. It can also affect an individual's ability to manage daily life situations. The SOC necessitates the student's ability to utilise and employ available resources and mechanisms to cope with stressful situations.

SOC has been used to understand individual differences in coping with stress according to the level of SOC exhibited. Bonacci et al., (2012) indicated that the SOC is a psychological resource that promotes health and strengthens the ability of individuals to deal with strain and stressful environments.

### **Components of Sense of Coherence**

#### *Comprehensibility*

Antonovsky (1993) views comprehensibility as the extent to which an individual views the stimuli from the interior and exterior surroundings that confront him/her as making cognitive sense. Is it information that can be considered as structured, consistent and clear rather than chaotic, noisy, disordered, accidental, random and inexplicable? Comprehensibility is also referred to as the extent to which individuals perceive the stimuli from within and without as structured, ordered and consistent information, based on the expectations that these stimuli will be predictable or explicable in the future (Maturure 2016; Strumpfer, 2009).

### *Manageability*

Manageability is the extent to which individuals experience that resources available are enough to cater for the demands created by the stimuli. It is an instrumental component of SOC which refers to the extent to which individuals perceive situations in their lives as manageable and endurable or challenging (Muller & Rothmann, 2009). Manageability can also be referred to as the extent to which individuals perceive events in life as bearable (Strumper, 1990; Maturure, 2016).

### *Meaningfulness*

Meaningfulness is the extent to which individuals experience life as emotionally making sense and considers difficulties and challenges created by life as worthy of commitment, worthy of investing energy, engagement and as welcome rather than taking them as burdens that one can do without (Muller & Rothmann, 2009). Meaningfulness is the extent to which individuals feel that life make sense emotionally rather than cognitively (Strumpfer, 2012; Maturure).

### **The Salutogenic Model of Sense of Coherence**

The Salutogenic Model was described in Antonovsky's 1979 book; Health, Stress and Coping, which posits that life experiences help shape one's SOC (Mittelmark et al., 2017). A strong SOC assist individuals to mobilise resources to cope with stressors and manage tension successfully (Mittelmark et al., 2017). The SOC help in determining one's movement on the health Ease/Dis-ease continuum. Figure 2 shows Antonovsky's Salutogenic Model.

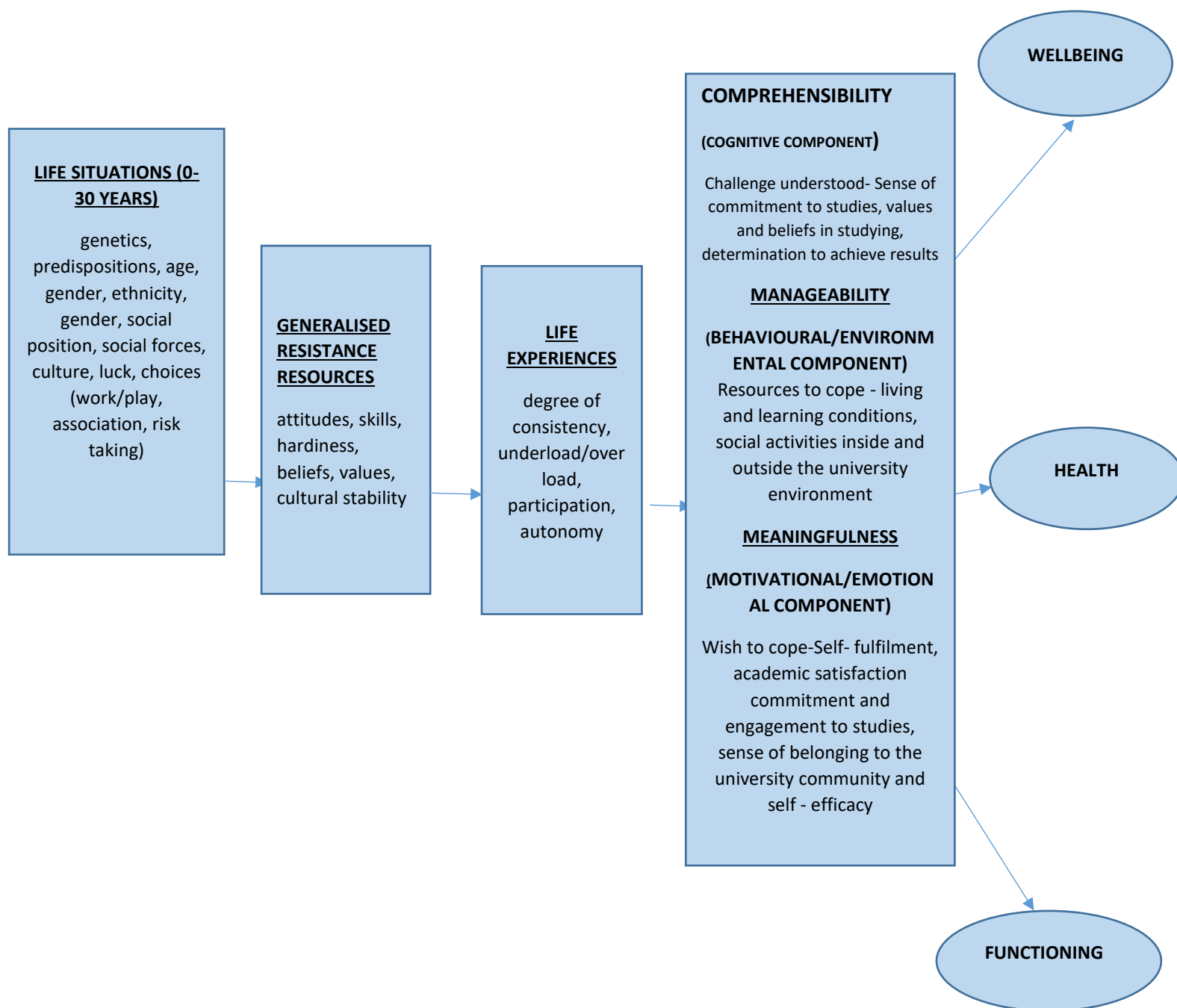


FIGURE 2: Antonovsky's Salutogenic Theory inspired by Antonovsky (1993) and Naidoo & Nadvil (2013).

Antonovsky (1993) stated that SOC is something that is not a personality trait and that is not behaviour which is fixed on one position like a coping strategy. It reflects an individual's general response to demands (Albertsen, Nielsen, & Borg, 2001).

Antonovsky (1993) argues that, it is based on psychosocial phenomena and biological material and it results from earlier experiences in life before 30 years of age and is known as GRRs (Super, Wagemakers, Picavert, Verkooijen, & Koelen, 2015).

GRRs are resources that are in an individual or in situations or factors around them that individuals use to reduce everyday life stressors (Lindstrom & Erikson, 2010; Super et al., 2015). These include knowledge, self-efficacy, beliefs, social support, cultural stability and attitudes. He says that they prevent the effects of stressors from developing into stress. GRRs allow people to experience their lives as structured, consistent and understandable. Individuals with a strong SOC can use generalised resources at their disposal adequately while those who have a weak one can be regarded as the opposite (Lindmark, Stenström, Gerdin, & Hugoson, 2010).

However, Antonovsky's SOC has been criticised because of the size of the correlations between SOC and psychological stress (Breslin, Hepburn, Ibrahim, & Cole, 2006). SOC has also been considered as a wide and broad philosophical approach to life which need further specification (Rosenbaum, 1990). Despite these criticisms, extensive research found SOC to be an effective tool for measuring psychological factors which lead to proper health and assist individuals to cope with stress across cultures (Maturure, 2016; Muller & Rothmann, 2009).

### ***THE RELATIONSHIP BETWEEN STRESS, SENSE OF COHERENCE AND COPING STRATEGIES***

Stress, SOC and coping strategies are distinct constructs which have attitude-similar structures and are related to overall health (Lindström & Eriksson, 2010). Stress occurs when the relationship between individuals and their environments is viewed as challenging and demanding and surpassing their resources so that their well-being is put at risk (Folkman & Lazarus, 1987). Coping is described as the cognitive and behavioural efforts someone makes to manage demands and challenges (which are called stressors) that an individual and the environment around him experiences. SOC deals with a relationship between health, stress and coping.

SOC assists individuals to experience their stressors (demands and challenges) as manageable. It also allows them to choose suitable coping resources rather than becoming helpless.

### **The buffering effects of Sense of Coherence**

Antonovsky (1993) proposed that, although SOC is not a direct stress buffer, it has a buffering (moderating) effect on stress because of its influence on the choice of coping strategies. People who have a higher SOC are the ones that mostly adopt adaptive strategies in a flexible way, suitable for the needs of a specific situation (Strumpfer, 2007). Despite Antonovsky's claim that it is not primarily a stress buffer, a growing number of studies have considered it as a stress resources buffer (Bakker & Demerouti, 2007).

Several studies found that SOC determines stress levels of individuals in an academic environment (Chu et al., 2016; Silver, 2013). Students with a strong SOC are likely to adopt stress coping strategies which leads to low levels of stress (Ryan, 2013). However, there is still a gap in the literature with regards to examining the moderating role of SOC on stress and the four components of stress coping strategies.

### **The moderating role of Sense of Coherence**

According to Antonovsky (1993) SOC influences the choice of coping strategies of individuals, which means that it has moderating effects on the relationship between coping strategies and stress. Figure 3 shows the moderating role of SOC on the stress coping components and stress.

### Underlying rationale for the current study

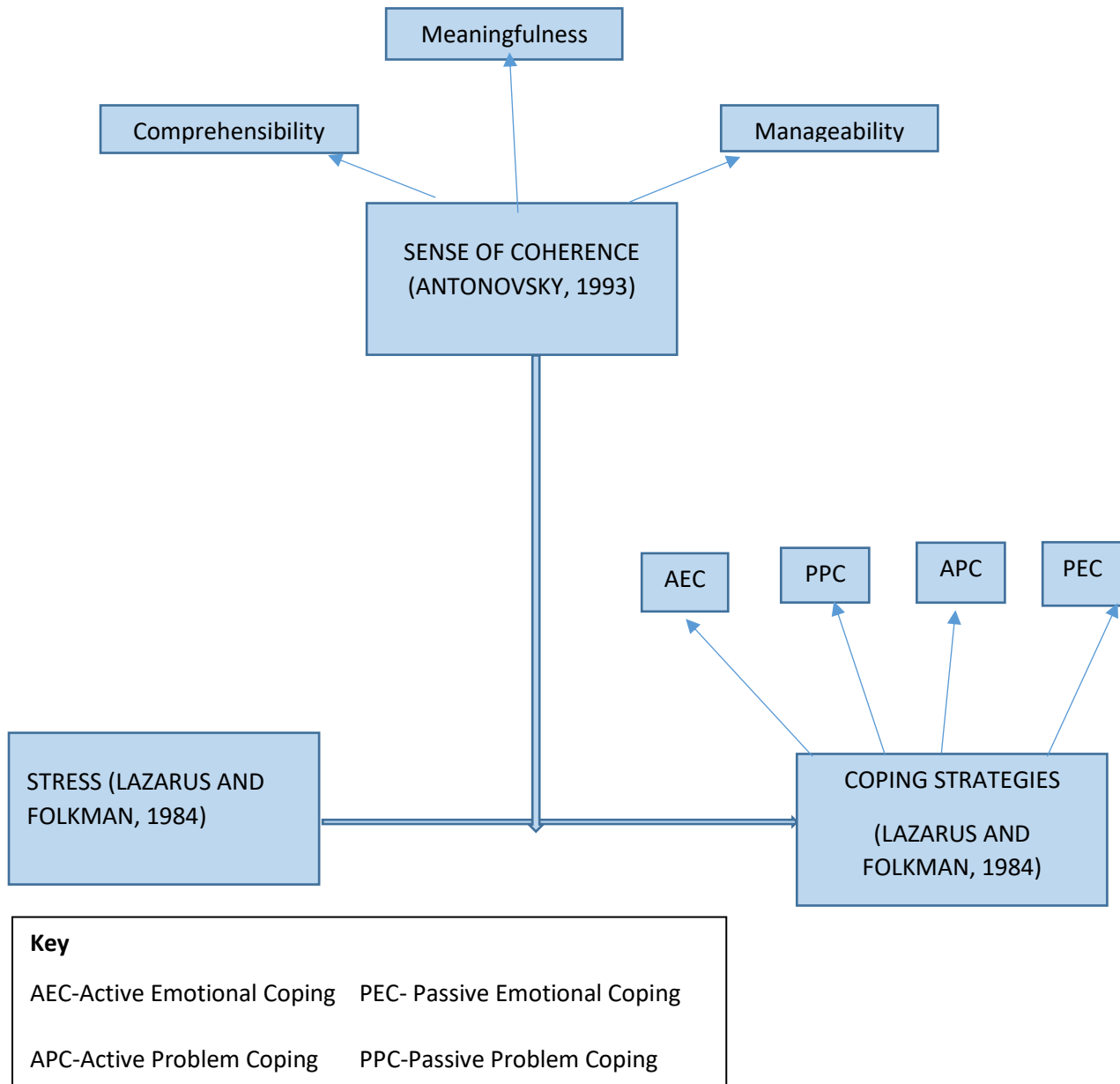


Figure 3: Inspired by Antonovsky (1993) and Lazarus and Folkman (1987)

## **RESEARCH OBJECTIVES**

- To examine the relationship between stress, SOC and stress coping strategies in a university setting.
- To examine the differences in stress levels of medical and Psychology students (non-medical) at a selected South African University.

## **RESEARCH QUESTIONS**

### **Main Research Question**

- What is the relationship between stress, SOC and stress coping among university students?
- Are there any differences between stress levels of medical and Psychology students at a selected South African University?

### **Sub Research Questions**

- Does SOC moderate the relationship between AEC and Perceived stress?
- Does SOC moderate the relationship between PEC and Perceived stress?
- Does SOC moderate the relationship between APC and Perceived stress?
- Does SOC moderate the relationship between PPC and Perceived stress?
- Is there a relationship between stress, SOC and AEC?
- Is there a relationship between, stress, SOC and PEC?
- Is there a relationship between stress, SOC and APC?
- Is there a relationship between stress, SOC and PPC?

## **CHAPTER 3: RESEARCH METHODS**

### ***RESEARCH DESIGN***

This study used quantitative research methods which are: non-experimental, cross-sectional, correlational and between subjects. This is because, although several forms of statistical analyses were conducted, there was no manipulation of variables, there was also no control group or random assignment of participants. The analysis involved a once-off collection of data and assessed the relationships between and among two or more variables.

Quantitative research is a process in which individuals collect and convert data into numerical form, so that statistical calculations can be made and conclusions drawn (Mokhuane, 2016). Data can be captured by computer or manually. Common descriptive statistics include mean, median, mode, range, statistical significance, variance, standard deviation, frequencies, percentage, ranking and factor analysis (Annon, Lukadi, & Warner, 2018). Quantitative data attempt to produce findings that are precise (Burns and Groove, 1993).

The researcher chose to use a quantitative approach because it allows the determination of the relationship between one thing (an independent variable, coping strategies and SOC) and another (a dependent variable, stress) within a sample. Sampling was done through choosing participants from the relevant population. The study aimed at drawing a total number of 200 students, both part-time and fulltime from the psychology and medical faculties, using non-probability convenience sampling. A convenience sampling technique would accommodate voluntary and participatory characteristics since participation was purely voluntary, that is only students who were readily available, easily accessible and willing to participate, made up the sample. Apart from that, convenience sampling is easy, cost effective and it ensures representativeness and generalisability of research findings to a population of a similar nature.

## ***Measuring Instruments***

Measuring instruments are devices for measuring a given phenomenon. They may be paper and pencil tests, questionnaires, interviews, research tools or set of guidelines for observation (Harris, Nagy, & Vardaxis, 2014). In this study, a questionnaire for collecting biographical data such as gender, age, population group, etc. was developed, the Orientation to Life Scale (Antonovsky, 1993) was used to measure SOC, the Stress Coping Inventory (Lin & Chen, 2010) was used to measure coping strategies and the Perceived Stress Scale (Cohen, Karmarch, Mermelstein, 1993) for measuring stress.

### **Demographic Questionnaire**

The demographic questionnaire was developed by the researcher to examine the characteristics of the final sample. Open-ended and close ended questions were used to gather information on ethnicity/race, faculty, university level, home language, age, gender, method of paying fees, marital status, whether the student have children or not and whether their parents attended university or not.

### **The Orientation to Life Scale or Sense of Coherence Scale**

The Orientation to Life Scale, mostly referred to as the SOC Scale was used to assess participants' SOC (Antonovsky, 1993). It is a 29-item scale, where items are assessed using a 7-point Likert Scale, where 1 and 7 are used to represent extreme ends of each continuum (Oster, Hark, Shea, & Von Feldt, 2005). It comprises 11 items on comprehensibility, 10 items on manageability and 8 items on meaningfulness. Thirteen items of the orientation to life scale were reversed during scoring. In some questions, 1 stood for never and 7 for very often, while in other questions, 1 stood for very often and 7 for never. Therefore, there was need to reverse some of the items.

The scale measures an individual's SOC and has three components; comprehensibility, manageability and meaningfulness. Higher scores indicate a strong SOC.

The SOC scales were scored with a single total score and not component scores since it was hypothesised that the SOC in its totality, is what influences the movement of the dis-ease/ease continuum as compared to its individual components (Antonovsky, 1987).

The Cronbach's alpha coefficient for this scale has been found to range between 0.80 to 0.90 for a normative sample (Naaldenberg, Tobi, Esker, & Vaandrager, 2011). The SOC has been widely used by researchers and is considered as a reliable and valid measure of SOC as well as being cross-culturally applicable (Coetzee & Oosthuizen, 2012; Erikson & Lindstrom, 2005).

The current study's Cronbach alpha coefficient for the SOC was 0.90. Generally, the acceptable cut-off for the reliability of a research scale is 0.7 (Sturmey, Newton, Cowley, Bouras, & Holt, 2005). Some researchers argue that 0.8 is the minimum value required for diagnostic reliability while between 0.6 and 0.8 are acceptable for exploratory purposes (Providas, 2016; Sturmey et al., 2005; Walker & Almond, 2010).

### **Stress Coping Style Inventory (Lin & Chen, 2010)**

The Stress Coping Style Inventory was used to assess coping strategies. It was developed for university students and college of technology students. It is divided into four factors which are AEC, PEC, APC and PPC. It is a 28-item scale, with items assessed using a 5-point Likert Scale, which ranges from 1 (completely disagree) to 5 (completely agree). The scale indicates that the higher the scores, the higher the rate of each coping style used. This Stress Coping Style Inventory has been widely used and considered as a reliable and valid measure with a Cronbach alpha coefficient of around 0.83 (Lin & Chen, 2010). This study used the subscales of the Stress Coping Inventory instead of the full scale since it is easier to interpret and there is no need to reverse the items. The nature of the study also required the use of subscales since students using different coping strategies were compared.

The Cronbach alpha coefficient for the Stress Coping Style Subscales for the current study was between 0.60 and 0.70.

The AEC subscale had a Cronbach alpha of 0.60, the PEC subscale had a Cronbach alpha of 0.68, the APC had a Cronbach alpha of 0.71 and the PPC had a Cronbach alpha of 0.61. Although the current study's Cronbach alpha was between 0.6 and 0.7, it is acceptable since the study was not for diagnostic purposes (Nagpal, Kumar, Kakar, & Bhartia, 2010). Several authors suggested that a coefficient of 0.6 is generally acceptable depending on the intention of the scale (Mosset al., 1998; Walker and Almond, 2010).

### **The Perceived Stress Scale (PSS) (Cohen, Kamarck & Mermelstein, 1983)**

This scale was developed to evaluate the extent to which experiences in an individual's life are appraised as stressful. It is one of the most used scales for measuring stress. It consists of ten items, with 5 positive and 5 negative items, rated on a 5-point Likert scale (Redenlinghuys, 2015). The PSS measures psychological stress, which is related to employment status, age, education, stress, income, sex and several other demographics.

Most researchers show that its face validity and content validity is good, and the Cronbach alpha coefficient is normally around 0.72 (Khalili et al., 2017). It was correlated with depressive, life-event scores, physical symptomology, social anxiety and utilisation of health services and results indicated satisfactory construct validity (Cohen, Kamarck, & Mermelstein, 1983). This current study's Perceived Stress Scale's Cronbach alpha coefficient was 0.9.

## ***RESEARCH PROCEDURE***

The researcher received ethical clearance from the selected South African University's Human Ethics Committee and permission from the University Registrar as indicated in Appendix G. After permission was granted, the researcher approached faculties and course coordinators to request for permission for their students to participate in the

study. A link to an electronic questionnaire, accompanied by an electronic participant information sheet and an invitation to participate was sent to students by e-mail with instructions to complete the online survey presented on the Survey Monkey platform.

The students were given a brief outline of the study, and an information sheet which explained the nature and purpose of the study as indicated in Appendix A. Participation was voluntary, anonymous and confidentiality of information was assured. The participants were also informed about the right to withdraw at any point in time before the submission of the survey. The completion process took around 10 to 15 minutes. The researchers gave research participants a month to access and complete the questionnaire. Data was then extracted and cleaned, and the researcher proceeded to the data analysis stage.

## ***DATA ANALYSIS***

Data collected was analysed using the Statistical Package for Social Sciences version 25 (SPSS) since it is appropriate for analysing data on human behaviour. Descriptive statistics, correlations, moderated regression and independence sample T-test statistical tests were used in this study.

### **Descriptive statistics**

Descriptive statistics were used to summarise data, including percentages, frequencies, means and standard deviations for each item of the questionnaires and to determine the skewness of the data and the central tendency of the scores. Tests of normality and homogeneity of variance were conducted to determine whether the data was normally distributed or not.

## **Reliability**

The reliability of the data was tested using the Cronbach alpha coefficient. This was done to assess the internal consistency of each construct.

## **Factor Analysis**

A confirmatory factor analysis (CFA) was used to test for the validity of the Stress Coping Inventory with four subscales; AEC, PEC, APC and PPC in order to determine whether the variables were closely related or not. The CFA refers to a statistical technique used to validate the factor structures of manifest variables (Friedman, 2014). Correlation coefficients which are less than or equal to 0,29 are considered as practically significant, with a small effect, while those which are greater than or equal to 0.30 are considered as significant with a medium effect and those with a coefficient greater than 0.50 are significant with a large effect (Reeve & Lee, 2014). Practical significance of correlation coefficients was set at a cut-off point of 0.30 (medium effect) (Reeve & Lee, 2014).

## **Correlations**

To determine the direction or the strength of the relationship between the stress, SOC and coping strategies variables, the Pearson Product-moment correlations were used at a 0.05 level of significance. P-values less than 0.05 were considered as statistically significant. Pearson Correlation coefficient ranges from 0.00 to +1.00 and .00 to -1.00. The closer the coefficient is to +1.00 or -1.00, the stronger the relationship while .00 indicates that the two variables are not related at all (Beavers et al., 2013). A positive coefficient means that there is a positive linear relationship while a negative one shows that there is a negative linear relationship (Beavers et al., 2013).

### **Independent Sample T-Test**

Stress levels between non-medical and medical students as well as on other demographics were compared. A p-value for significance was set at 5% (0.05) and effect size cut-offs were 0.2 weak; 0.5 moderate and 0.8 strong.

### **Moderated regressions**

There is need to investigate whether SOC moderates the relationship between stress and the components of stress coping, therefore moderated regression was used. Moderation implies an enhancing or interaction effect, where a moderating variable introduced change the magnitude or the direction of an association between two variables. The moderator could enhance, where increasing it would increase the effect of the predictor on the outcome. It could also buffer, where the effect of the independent variable on the dependent variable is increased. Finally, it could be antagonistic, where the effect of the independent variable on the dependent variable is reversed due to the increase in the moderator.

### ***RESEARCH ETHICS***

Research ethics focuses on the welfare of research participants and extends into areas such as academic misconduct and plagiarism. They are concerned with assuming that the dignity of human participants is respected, not abused or violated in the search for knowledge, scientific progress or, more mundanely, for career advancement. They also strive to make the value component of research more explicit (Blanche, Blanche, Durrheim, & Painter, 2006). The following research ethics were adhered to throughout the research process:

### **The principles of autonomy, integrity and respect for the dignity of people**

The researcher ensured that all participants' rights were taken into consideration including their freedom to withdraw.

### **The principle of non-maleficence**

This was done by ensuring that no harm befalls research participants as a direct consequence of the research.

### **The principle of beneficence**

The researcher maximised the benefits that the research afforded the participants in the study.

### **The principles of privacy, informed consent, voluntary participation and ensuring confidentiality of data and maintenance of anonymity of those taking part**

This was achieved by making sure that paper-based records were kept in locked cabinets and computer-based records securely stored in password protected files and only the researcher had access. The information sheet explained the purpose of the study, procedures involved, voluntary participation and the right to withdraw.

### **The principles of justice, fairness, transparency, accountability, risk minimisation and non-exploitation**

Clarity with regards to the prescribed duties and rights of the participants mentioned above was given, and the researcher's accountability to any damage likely to be caused by the study.

**The principle of respect for cultural differences**

The researcher accommodated differences in values, beliefs and culture by making sure that participants are informed of their rights with regards to this specific area.

## **CHAPTER 4: RESEARCH RESULTS**

### ***INTRODUCTION***

The findings of the study are discussed in the context of literature that was reviewed in chapter two. Analyses of responses included the profiling of respondents in terms of demographics such as gender, age, race and home language. The data from the survey monkey was imported into IBM, SPSS and AMOS to present statistical data from a quantitative point of view. The data was analysed using methods described in Chapter 3.

The purpose of the study was to examine the relationship between SOC, Coping Strategies and Stress levels among medical and psychology students at the University of Witwatersrand. This chapter presents results of the Descriptive analysis of the sample of the study, the Reliability tests, CFA and the results of the Moderation regression analysis.

### ***SAMPLE CHARACTERISTICS***

A total number of 445 students accessed and submitted the online questionnaires. Of these, 80 students did not complete all the questionnaires and were excluded from the study, which means that the final sample consisted of 365 students in total. The sample comprised of 286 females (78.7%), making up the majority, 77 males (21%) and 2 others (0.3%) refused to disclose their status (see table 1).

In terms of ethnicity or race 172 (47.1%) were Blacks, who were the majority, followed by Whites 111 (30.4%), Indians 48 (13.2%), Coloured 21 (5.8%) and others 13 (3.6%) (See table 1). There were 19 different languages identified spoken by the students, the majority were English 177 (49%), followed by IsiZulu 40 (11%), Setswana 25 (6.8%), IsiXhosa 23 ( 6.3 %), Sesotho 19 (5.2%), Afrikaans 17 (4.7%), Sesotho Saleboa 18 (4.9%), Tshivenda 9 (2.5%), Xitsonga 8 (2.2 %), Siswati 5 (1.4%), IsiNdebele 5 (1.4%) and 14 others which consisted of: Arabic 5 (0.21%), Yoruba 5 (0.5%), German 2 (0.6%), Gujarati 2 (0,6%), Hausa 2 (0.6%), Swahili 2 (0.6%), Shona (0.24 %) and Urdu 2 (0,6%)

With regards to faculty, 254 (69.6%) students were non-medical and 111 (30.4%) were medical (see table 1). The sample included 140 (38.6%) first year students, 79 (21.6%) second year students, 74 (20.3%) third year students, 6 (1.6%) fourth year students, 1 (0.3%) fifth year student and 64 (17.5%) post-graduates (see table 4). With regards to marital status, 315 (86.3 %) students were single, followed by married 32 (8.8%) and 18 (4.9%) others (17 were in a relationship and 1 divorced), (see table 1).

Three hundred and seventeen (86.8%) students did not have children and 45 (12.3%) students had children (see table 1). In terms of students whose parents attended university, 194 (52.9%) students' parents attended university, while 169 (46.3%) students' parents did not attend university (see table 8).

Sixty-nine (18.9%) students had their fees paid by the National Students Financial Aid Scheme (NSFAS), 44 (12.3%) students by bursaries, 27 (7.4%) students, by scholarships, 158 (43.3%) students parental or family support, 53 (14.5%) students own funds and 13 (3.6%) others which consisted of: 9, bank loans; 1, parent split; 1 post merit awards; and 2 had no funding (see table 1).

**TABLE 1: SAMPLE CHARACTERISTICS**

|                                   | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| <b>Gender</b>                     |           |            |
| Female                            | 286       | 78.7       |
| Male                              | 77        | 21         |
| Other                             | 2         | 0.3        |
| <b>Race/Ethnicity</b>             |           |            |
| Black African                     | 171       | 47.1       |
| Coloured                          | 111       | 30.4       |
| White                             | 48        | 13.2       |
| Asian/Indian                      | 21        | 5.8        |
| Other                             | 13        | 3.6        |
| <b>Age</b>                        |           |            |
| 18-19                             | 87        | 23.8       |
| 20-25                             | 196       | 54.0       |
| 26-35                             | 38        | 10.4       |
| 36-45                             | 16        | 4.4        |
| 55-64                             | 2         | 0.5        |
| 46+                               | 25        | 6.8        |
| <b>Home Language</b>              |           |            |
| Afrikaans                         | 17        | 4.7        |
| English                           | 178       | 49.0       |
| IsiNdebele                        | 5         | 1.4        |
| IsiXhosa                          | 23        | 6.3        |
| IsiZulu                           | 40        | 11.0       |
| Sesotho                           | 19        | 5.2        |
| Sesotho Saleboa                   | 22        | 6.0        |
| Setswana                          | 25        | 6.8        |
| SiSwati                           | 5         | 1.4        |
| Tshivenda                         | 9         | 2.5        |
| Xitsonga                          | 8         | 2.2        |
| Others                            | 14        | 3.8        |
| <b>Faculty</b>                    |           |            |
| Medical                           | 111       | 30.4       |
| Non-Medical                       | 254       | 69.6       |
| <b>University Level</b>           |           |            |
| First Year                        | 140       | 38.6       |
| Second Year                       | 79        | 21.6       |
| Third Year                        | 74        | 20.3       |
| Fourth Year                       | 6         | 1.6        |
| Fifth Year                        | 1         | 0.3        |
| Post-Graduate                     | 64        | 17.5       |
| <b>Fees</b>                       |           |            |
| NSFAS                             | 69        | 18.9       |
| Bursary                           | 45        | 12.3       |
| Scholarship                       | 27        | 7.4        |
| Parent/Family Support             | 158       | 43.3       |
| Own Funds                         | 53        | 14.5       |
| Other                             | 13        | 3.6        |
| <b>Parent Attended University</b> |           |            |
| Attended University               | 196       | 53.3       |
| Not Attended University           | 169       | 46.7       |
| <b>Marital Status</b>             |           |            |
| Married                           | 32        | 8.8        |
| Single                            | 315       | 86.3       |
| Other                             | 18        | 4.9        |
| <b>Child/No Child</b>             |           |            |
| Child                             | 46        | 12.4       |
| No Child                          | 319       | 87.5       |

## **DESCRIPTIVE STATISTICS AND MEASUREMENT SCALE**

The mean and standard deviation of the instruments used in this study were recorded on Table 2. The Orientation to life, a scale which measures the SOC of individuals, is a 29-item questionnaire which has 11 questions related to comprehensibility, 10 related to manageability and 8 on meaningfulness. The SOC Scales shows a minimum score of 1.10 and a maximum score of 6.62, with an average of 4.05 (SD=0.88). The Perceived stress was measured by the Perceived Stress Scale developed by Cohen (1983) and shows a minimum score of 1.10 and a maximum score of 5.00 with an average of 3.33 (SD=0.77). Stress Coping was measured by the Stress Coping Style Inventory developed by Lin & Chen, 2010 and the results shows that AEC had a minimum score of 1,75 and a maximum score of 5.00, with an average score of 3.53 (SD=0.56). PEC had a minimum score of 1.00 and a maximum score of 4.67 with an average of 2.42 (SD=0.70). APC had a minimum score of 1.00 and a maximum score of 5.00 with an average of 3.48 (SD=0.70) and PPC had a minimum score of 1.00 and a maximum score of 4.50 with an average of 2.61 (SD=0.62).

**Table 2: Descriptive Statistics of the Measurement Scale using Mean of the Scores**

|                                 | <b>N</b> | <b>Minimum</b> | <b>Maximum</b> | <b>Mean</b> | <b>Std Deviation</b> |
|---------------------------------|----------|----------------|----------------|-------------|----------------------|
| <b>Perceived Stress</b>         | 365      | 1.10           | 5.00           | 3.33        | 0.77                 |
| <b>Sense of Coherence</b>       | 365      | 1.21           | 6.62           | 4.05        | 0.88                 |
| <b>Active Emotional Coping</b>  | 365      | 1.75           | 5.00           | 3.53        | 0.56                 |
| <b>Passive Emotional Coping</b> | 365      | 1.00           | 4.67           | 2.42        | 0.70                 |
| <b>Active Problem Coping</b>    | 365      | 1.00           | 5.00           | 3.48        | 0.70                 |
| <b>Passive Problem Coping</b>   | 365      | 1.00           | 4.50           | 2.61        | 0.62                 |
| <b>Comprehensibility</b>        | 365      | 1.00           | 6.55           | 3.34        | 0.94                 |
| <b>Meaningfulness</b>           | 365      | 1.00           | 7.00           | 4.69        | 1.16                 |
| <b>Manageability</b>            | 365      | 1.00           | 7.00           | 4.31        | 0.98                 |
| <b>Valid N (Listwise)</b>       | 365      |                |                |             |                      |

### ***NORMAL DISTRIBUTION***

The degree of normality was examined to determine the appropriate analysis (parametric and non-parametric) for answering the research questions.

Normality was determined using kurtosis coefficients, histograms and skewness coefficients. The coefficients for kurtosis and skewness fell between -1 and +1 which indicated a normal distribution. Additionally, normal Q-Q plots indicated a normal distribution (see Figures 8-12, in Appendix G). The data is normally distributed because the data points will be close to the diagonal line.

**Table 3: Normality Statistics of the Main Variables**

|                          | Normality Statistics |          |          |
|--------------------------|----------------------|----------|----------|
|                          | N                    | Kurtosis | Skewness |
| Perceived Stress         | 365                  | -0.50    | -0.27    |
| Sense of Coherence       | 365                  | 0.01     | -0.06    |
| Active Emotional Coping  | 365                  | 0.5      | -0.14    |
| Passive Emotional Coping | 365                  | -0.27    | 0.13     |
| Active Problem Coping    | 365                  | 0.67     | -0.49    |
| Passive Problem Coping   | 365                  | -0.11    | 0.11     |
| Comprehensibility        | 365                  | 0.076    | 0.37     |
| Meaningfulness           | 365                  | 0.076    | 0.54     |
| Manageability            | 365                  | 0.006    | -0.16    |
| Valid N (Listwise)       | 365                  |          |          |

### ***CRONBACH ALPHA TEST OF THE MEASUREMENT SCALES***

To check for reliability and internal consistency of the constructs, Cronbach's Alpha test was conducted so that the internal consistency of each scale could be determined. A Cronbach's Alpha coefficient that is close to 1.0 means that the questions are measuring similar dimensions of factors. This would mean that any factor with a Cronbach's Alpha coefficient which is less than 0.2 would be eliminated. In this case all the factors have an

alpha greater than 0.2 and therefore we did not eliminate any questions. The alpha test was conducted on the Orientation to the life Scale which measures the SOC, and the overall alpha value of 0.90 was obtained with this scale.

The Cronbach Alpha coefficients for Perceived stress were also recorded, and the overall scores of raw and standardised coefficients were 0.89 and 0.90 respectively. The four components of Stress Coping Inventory scale had alpha values of: AEC (0.60), PEC (0.68), APC (0.71) and PPC (0.61).

**Table 4: Reliability of Instruments and Subscales**

|                                 | Cronbach alpha coefficient |              | Mean | Number of Items |
|---------------------------------|----------------------------|--------------|------|-----------------|
|                                 | Raw                        | Standardised |      |                 |
| <b>Perceived Stress</b>         | 0.89                       | 0.89         | 3.33 | 10              |
| <b>Sense of Coherence</b>       | 0.90                       | 0.90         | 4.05 | 29              |
| <b>Active Emotional Coping</b>  | 0.60                       | 0.63         | 3.53 | 11              |
| <b>Passive Emotional Coping</b> | 0.68                       | 0.68         | 2.42 | 10              |
| <b>Active Problem Coping</b>    | 0.70                       | 0.71         | 3.48 | 8               |
| <b>Passive Problem Coping</b>   | 0.61                       | 0.63         | 2.61 | 8               |
| <b>Comprehensibility</b>        | 0.90                       | 0.78         | 3.34 | 6               |
| <b>Meaningfulness</b>           | 0.77                       | 0.78         | 4.69 | 6               |
| <b>Manageability</b>            | 0.75                       | 0.75         | 4.31 | 8               |
| <b>Valid N (Listwise)</b>       |                            |              |      |                 |

Past research studies indicated that a Cronbach alpha between 0.60 and 0.70 is acceptable if the intention of the scale is not for diagnostic purposes (Nagpal, Kumar, Kakar, Bartia, 2010). Some researchers also argued that the reliability of the scale can be determined by the sample size and that in some cases a Cronbach alpha of 0.50 is acceptable (Bujang, Omar, & Baharum, 2018).

## CONFIRMATORY FACTOR ANALYSIS

### Confirmatory Factor Analysis of Coping Strategies

To evaluate the Stress Coping Inventory model and test how well the model fits the research data, a CFA (Confirmatory Factor Analysis) was conducted. The CFA explores if there are clear pre-defined variables which contribute to the manifest variables (Friedman, 2014). For the model to be considered as fit, the global fit statistics should be examined. The proposed cut-offs for an excellent fit are as follows:  $p\text{-value} > 0.05$ ,  $RMSEA < 0.05$ ,  $GFI > 0.95$ ,  $AGFI > 0.90$  and  $CFI > 0.95$  (Lee & Park, 2014). If  $RMSEA < 0.08$ ,  $GFI > 0.90$  and  $CFI > 0.90$ , the model could be considered as acceptable (Lee & Park, 2014). Model 1 did not produce an acceptable fit;  $p < 0.05$ ,  $GFI = 0.50$ ,  $CFI = 0.71$ ,  $RMSEA = 0.07$ .

#### Model 1

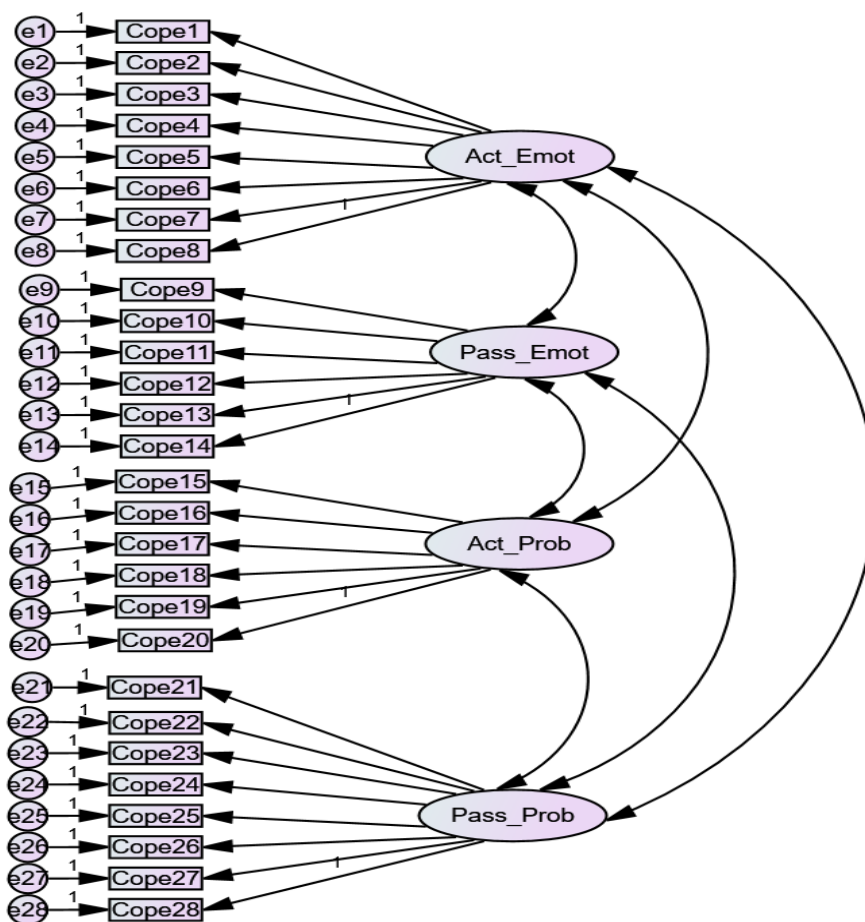


Figure 4: CFA for the Stress Coping Inventory Model 1

The final model was run after the initial fit suggested covariances between some of the manifest variables. The model Chi Squared statistic ( $p=0.00$ ) and the discrepancy between sample and fitted covariance's matrices was significant, meaning that the null hypothesis of a good fit to the data could be rejected. The value of RMSEA value of 0.06 was more than an excellent fit of 0.05, but was less than 0, 08, which is acceptable. The p-value was significant (0.00), the GFI (0.86), the AGFI (0.83) and the CFI (0.81) of the model were not within the recommended threshold for good fit of 0.95,0.90 and 0.90 respectively which suggested an unacceptable model fit.

## Model 2

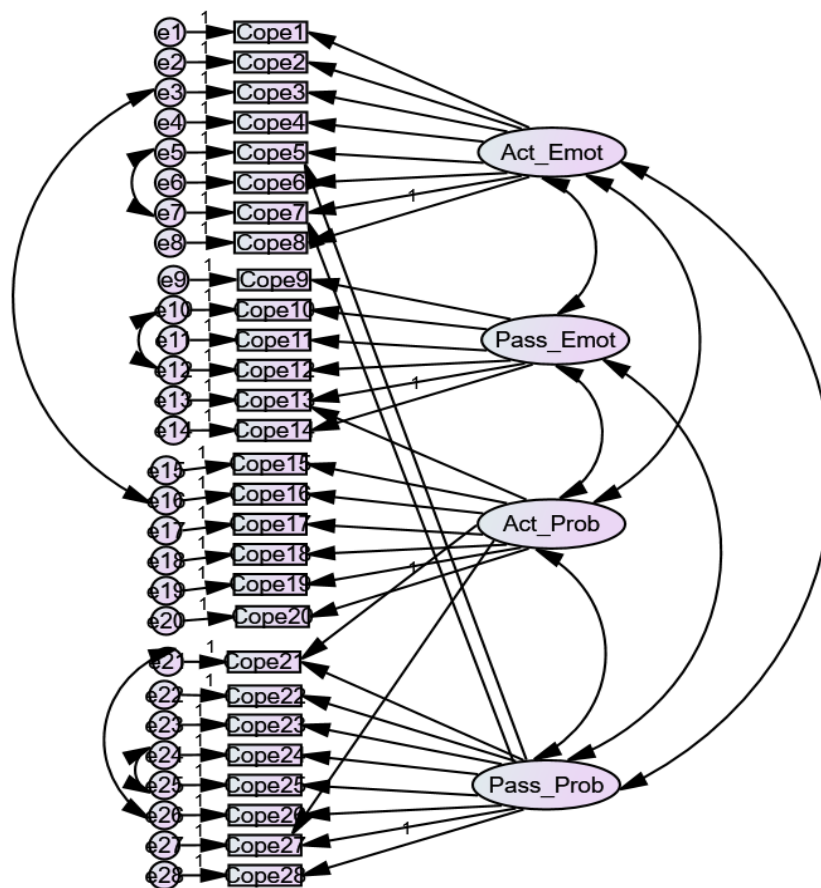


Figure 5: CFA for the Stress Coping Inventory: Model 2

This indicated that the data did not fully support the subscale structure as stated by the developer. However, there was need to relate the findings with other research in the field and there was a need to use standard specifications of the subscales. Possible reasons for the differences are explained in the discussion section.

### ***CORRELATION ANALYSIS***

A Pearson product-moment correlation coefficient ( $r$ ) test was conducted to determine the degree of relationship between the variables and determine if there was a linear relationship between the variables as indicated (Green & Salkind, 2011). The correlation coefficient value ( $r$ ) ranging from 0.10 to 0.29 is considered weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1.0 is considered strong (Wong, Tan, & Hiew, 2005).

#### **Is there a relationship between Perceived Stress and subscales of Sense of Coherence?**

Table 5 shows that the Pearson Correlations between Perceived stress and subscales of SOC were negative: Comprehensibility ( $r=-0.62$ ,  $p<0.01$ ), Meaningfulness ( $-0.53$ ,  $p<0.01$ ) and Manageability ( $r=-0.67$ ,  $p<0.01$ ). The correlations in Table 5 suggest that a high SOC is associated with low stress levels.

**Table 5: Correlation between Perceived Stress and Components of SOC**

|                          |     | Comprehensibility | Meaningfulness | Manageability | Perceived Stress |
|--------------------------|-----|-------------------|----------------|---------------|------------------|
| <b>Comprehensibility</b> | $r$ | 1.00              | 0.55**         | 0.69**        | -0.62**          |
| <b>Meaningfulness</b>    | $r$ | 0.55**            | 1.00           | 0.64**        | -0.53**          |
| <b>Manageability</b>     | $r$ | 0.69**            | 0.64**         | 1.00          | -0.67**          |
| <b>Perceived Stress</b>  | $r$ | -0.62**           | -0.53**        | -0.67**       | 1.00             |

\*\*Correlation is significant at the 0.01 level (2-tailed)

### Is there a relationship between Perceived Stress and subscales of Coping Strategies?

The Pearson correlation coefficient between Perceived stress and subscales of Coping Strategies: AEC ( $r=-0.31$ ), PPC ( $r=0.33$ ), APC ( $r=-0.31$ ) and PEC ( $r=0.49$ ) was significant as indicated in Table 6. This shows that Perceived stress is positively related to Passive Coping Strategies and negatively related to Active Coping Strategies.

**Table 6: Correlation between Perceived Stress and subscales of Coping Strategies**

|                         |          | Perceived Stress | AEC     | PEC     | APC     | PPC     |
|-------------------------|----------|------------------|---------|---------|---------|---------|
| <b>Perceived Stress</b> | <i>r</i> | 1                | -0.31** | 0.49**  | -0.31** | 0.33**  |
| <b>AEC</b>              | <i>r</i> | -0.31**          | 1       | -0.25** | 0.51**  | -.041   |
| <b>PEC</b>              | <i>r</i> | 0.49**           | -0.25** | 1       | -0.32** | 0.39**  |
| <b>APC</b>              | <i>r</i> | -0.31**          | 0.51**  | -0.31** | 1       | -0.24** |
| <b>PPC</b>              | <i>r</i> | 0.33**           | -0.04   | 0.39**  | -0.24** | 1       |

\*\* . Correlation is significant at the 0.05 level (2-tailed).

### Is there a relationship between Perceived Stress and full scales of Sense of Coherence and Components of Stress Coping?

There was a high significant negative association between Perceived stress and full scale of SOC ( $r=-0.71$ ), suggesting that high levels of SOC will decrease the stress levels of the students. SOC had a negative statistically significant relationship with Passive Coping Strategies, PEC ( $r=-0.55$ ) and PPC ( $r=-0.37$ ) as shown in Table 7. The weaker the students' Sense of Coherence, the more the usage of Passive Coping Strategies and the higher their stress levels. A positive statistically significant relationship was found between SOC and Active Coping Strategies, AEC ( $r=0.43$ ) and APC ( $r=0.46$ ) as shown in Table 7. The stronger the SOC: the more the usage of Active Coping Strategies (AEC and APC) and the lesser the stress levels.

The Pearson correlation coefficient between Perceived stress and subscales of Coping Strategies: PEC ( $r=0.49$ ,  $p<0.05$ ) and PPC ( $r=0.33$ ,  $p\text{-value}<0.05$ ) was positively significant.

The results indicate that the higher the Passive Emotional Coping, and Passive Problem Coping scores, the greater the Perceived stress of students. Perceived stress had a negative statistically significant relationship with APC ( $r=-.31$ ,  $p<0.05$ ) and AEC ( $r=-.31$ ,  $p<0.05$ ) as shown in Table 7. Higher scores in AEC and APC strategies were associated with lower stress levels of the students.

**Table 7: Correlations of Perceived Stress and full scales of SOC and Components of Stress Coping**

|               |          | SOC    | Stress | AEC    | PEC    | APC    | PPC    |
|---------------|----------|--------|--------|--------|--------|--------|--------|
| <b>SOC</b>    | <b>r</b> | 1.0    | -.71** | .43**  | -.55** | .46**  | -.37** |
| <b>Stress</b> | <b>r</b> | -.71** | 1.0    | -.31** | .49**  | -.31** | .33**  |
| <b>AEC</b>    | <b>r</b> | .43**  | -.31** | 1.0    | -.25** | .51**  | -.41   |
| <b>PEC</b>    | <b>r</b> | -.55** | .49**  | .25**  | 1.0    | -.32** | .40**  |
| <b>APC</b>    | <b>r</b> | .46**  | -.31** | .51**  | -.32** | 1.0    | -.24   |
| <b>PPC</b>    | <b>r</b> | -.37   | .33**  | -.41   | .40**  | -.24   | 1.0    |

\*\*Correlation is significant at the 0.05 level (2-tailed)

## **INDEPENDENT SAMPLE T TESTS**

### **Are there any differences between stress levels of medical and non-medical students?**

Results for the levels of stress measurement indicated that the non-medical students group had a mean of 3.31 ( $n=254$ ,  $SD=0.77$ ) and medical students had a group mean of 3.37 ( $n=111$ ,  $SD=0.76$ ). The Independent-Samples T Test procedure was performed to compare the means for Medical and Non-Medical students. The Levene's Test for Equality of variances has a p-value of 0.673 and is not significant at 5% level of significance. We fail to reject the null hypotheses and conclude that there is no difference between the mean levels of stress of medical and non-medical students at the University of Witwatersrand.

### **Are there any differences between stress levels of male and female students?**

The female students group had a mean stress level of 3.43 ( $n=285$ ,  $SD=0.70$ ) and male students of 3.01 ( $n=76$ ,  $SD=0.85$ ). The t-test had a p-value of 0.05 and was significant at 5% level of significance. We reject the null hypotheses and conclude that there is a statistical evidence for a difference between the means of female and male students at the selected South African University. This suggests that females were more stressed than males.

### **Are there any differences between stress levels of married students and single students?**

Students who were single had a group mean of 3.36 ( $n=315$ ,  $SD=.77$ ) and those who were married had a group mean of 3.07 ( $n=32$ ,  $SD=0.77$ ). The p-value was statistically significant (0.04) which shows that there were differences between stress levels of single and married students. Single students were more stressed than married students.

### **Are there any differences between students who are parents and those who are not?**

Students who were not parents had a group mean of 3.00 ( $n=317$ ,  $SD=0.83$ ) and whilst those who were parents had a group mean of 3.38 ( $n=45$ ,  $SD=0.76$ ). The p-value was statistically significant (0.002) which suggest that students with children were more highly stressed than those without children.

## ***MODERATION REGRESSION ANALYSIS***

A moderation technique (Hayes' Process Macro, Version 3) was used to determine whether the predictor variables are moderated by the SOC. Moderation occurs where the introduction of a new variable (Moderator) results in either an enhancing or an interaction effect which changes the magnitude or the direction between the two variables.

### Does Sense of Coherence moderate the relationship between Active Emotional Coping and Perceived Stress?

The model summary shows that approximately 50% of the variance in Perceived stress was accounted for by the predictors ( $r^2 = 0.50$ ). Results of the moderation regression analysis in Table 8 indicates that SOC did not moderate the relationship between AEC and Perceived stress ( $b=-0.1$  and  $p=0.06$ ). However, the main effect of SOC indicates that participants with lower SOC scores showed higher stress and those with higher SOC had less stress.

**Table 8: Sense of Coherence on Active Emotional Coping and Perceived Stress**

|                              | R    | R <sup>2</sup> | R <sup>2</sup><br>Change | B     | SE   | T      | p-value |
|------------------------------|------|----------------|--------------------------|-------|------|--------|---------|
| <b>Model Summary</b>         | 0.71 | 0.50           |                          |       |      |        | 0.00    |
| <b>Model</b>                 |      |                |                          |       |      |        |         |
| Active Emotional Coping(AEC) |      |                |                          | 0.03  | 0.06 | -0.47  | 0.64    |
| Sense of Coherence (SOC)     |      |                |                          | -0.62 | 0.04 | -17.04 | 0.00    |
| Interaction (AECxSOC)        |      |                | 0.00                     | -0.10 | 0.05 | -1.87  | 0.06    |

### Does Sense of Coherence moderate the relationship between Passive Emotional Coping and Perceived Stress?

The model summary shows in Table 9 that approximately 52% of the variance in Perceived stress was accounted for by the predictors ( $r^2 = 0.52$ ). SOC moderated the relationship between PEC and stress ( $b=0.1$  and  $p=0.02$ ) as indicated in Table 9. The conditional effects of X and Y at values of the moderator, shows that at low levels of SOC, the coefficient was not significant, which means that irrespective of the degree of PEC, the degree of stress was the same and this was higher than when the SOC was medium or high. For medium and high SOC, those students who used PEC got more stressed as the degree of PEC increased. The interactions effects in Figure 5 shows an enhancing effect that as SOC decreased, stress levels increased as the usage of PEC increased.

Table 9: Sense of Coherence on Passive Emotional Coping and Perceived Stress

|                                                                            | R    | R <sup>2</sup> | R <sup>2</sup><br>Change | B     | SE   | t      | p-value |
|----------------------------------------------------------------------------|------|----------------|--------------------------|-------|------|--------|---------|
| <b>Model Summary</b>                                                       | 0.72 | 0.52           |                          |       |      |        | 0.00    |
| <b>Model</b>                                                               |      |                |                          |       |      |        |         |
| Passive Emotional Coping (PEC)                                             |      |                |                          | 0.17  | 0.05 | 3.52   | 0.00    |
| Sense of Coherence (SOC)                                                   |      |                |                          | 0.54  | 0.04 | -14.08 | 0.00    |
| Interaction (PEC x SOC)                                                    |      |                | 0.01                     | -0.10 | 0.04 | 2.29   | 0.02    |
| <b>Conditional Effects of PEC on<br/>Stress at values of the moderator</b> |      |                |                          |       |      |        |         |
| Low SOC                                                                    |      |                |                          |       | 0.06 | 1.58   | 0.12    |
| Medium SOC                                                                 |      |                |                          |       | 0.05 | 3.49   | 0.00    |
| High SOC                                                                   |      |                |                          |       | 0.06 | 4.10   | 0.00    |

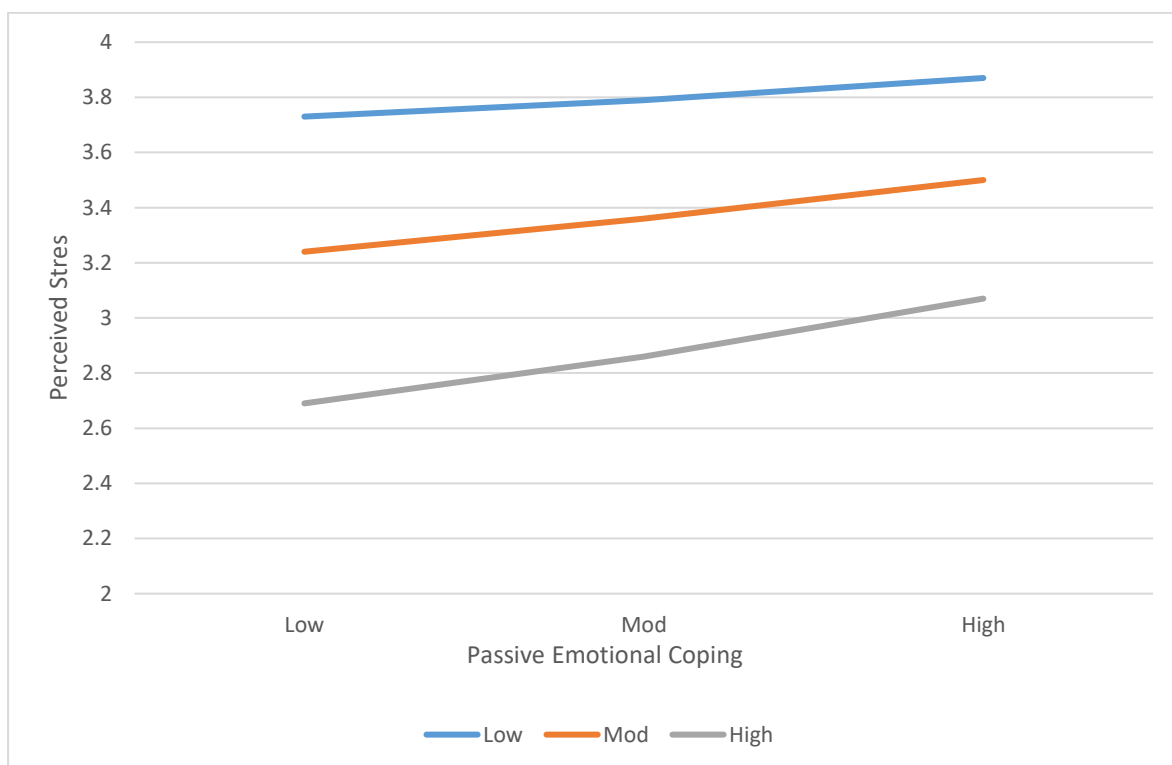


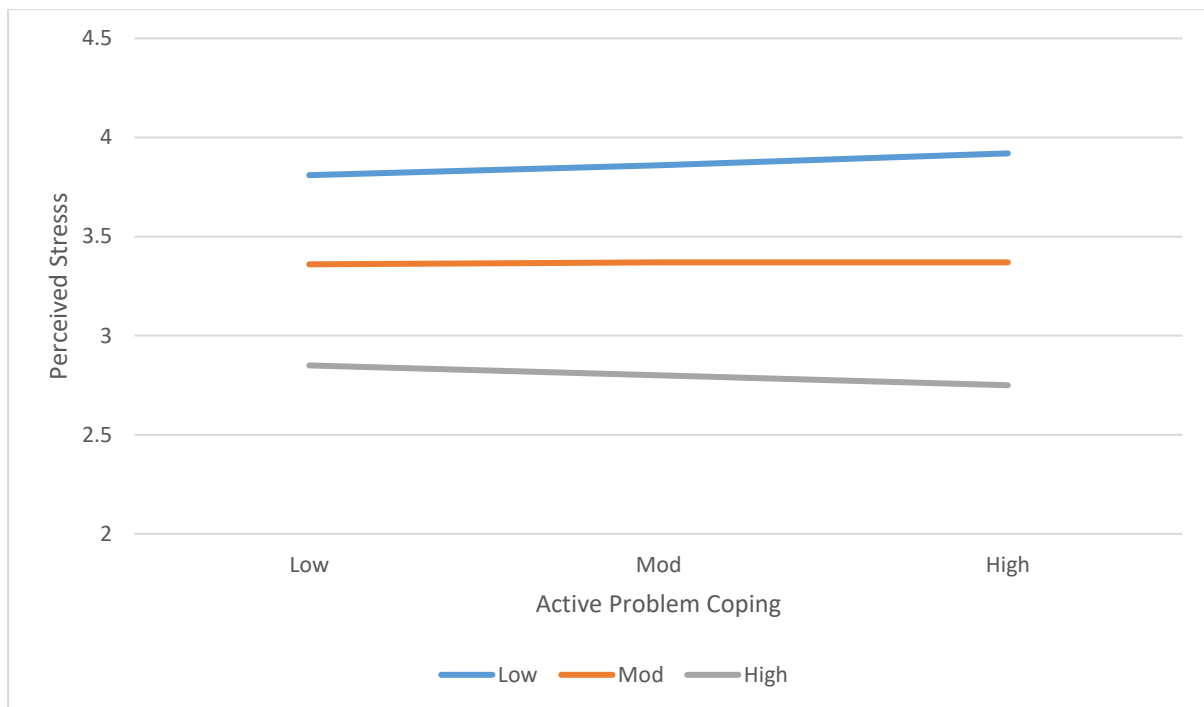
Figure 6: Interaction Plot – Sense of Coherence, Passive Emotional Coping and Perceived Stress

### Does Sense of Coherence moderate the relationship between Active Problem Coping and Perceived Stress?

The model summary shows that approximately 50% of the variance in Perceived stress was accounted for by the predictors ( $r^2 = 0.50$ ). Table 9 indicates that SOC moderated the relationship between stress and APC ( $b=-0.09$  and  $p=0.04$ ). The main effects of Sense of Coherence show that participants with high SOC scores had low stress levels, while those with a low SOC had high stress levels. Figure 6 shows an interaction effect that as SOC increased, stress levels decreased as the usage of APC increased.

**Table 10: Sense of Coherence on Active Problem Coping and Perceived stress**

|                                                                            | R    | R <sup>2</sup> | R <sup>2</sup><br>Change | B     | SE   | T      | p-value |
|----------------------------------------------------------------------------|------|----------------|--------------------------|-------|------|--------|---------|
| <b>Model Summary</b>                                                       | 0.71 | 0.50           |                          |       |      |        | 0.00    |
| <b>Model</b>                                                               |      |                |                          |       |      |        |         |
| Active Problem Coping (APC)                                                |      |                |                          | 0.01  | 0.05 | 0.16   | 0.87    |
| Sense of Coherence (SOC)                                                   |      |                |                          | 0.62  | 0.04 | -17.01 | 0.00    |
| Interaction (APC x SOC)                                                    |      |                | 0.01                     | -0.92 | 0.04 | -2.06  | 0.04    |
| <b>Conditional Effects of APC on<br/>Stress at values of the moderator</b> |      |                |                          |       |      |        |         |
| Low SOC                                                                    |      |                |                          |       | 0.06 | 1.46   | 0.15    |
| Medium SOC                                                                 |      |                |                          |       | 0.05 | 1.19   | 0.85    |
| High SOC                                                                   |      |                |                          |       | 0.06 | -1.19  | 0.24    |



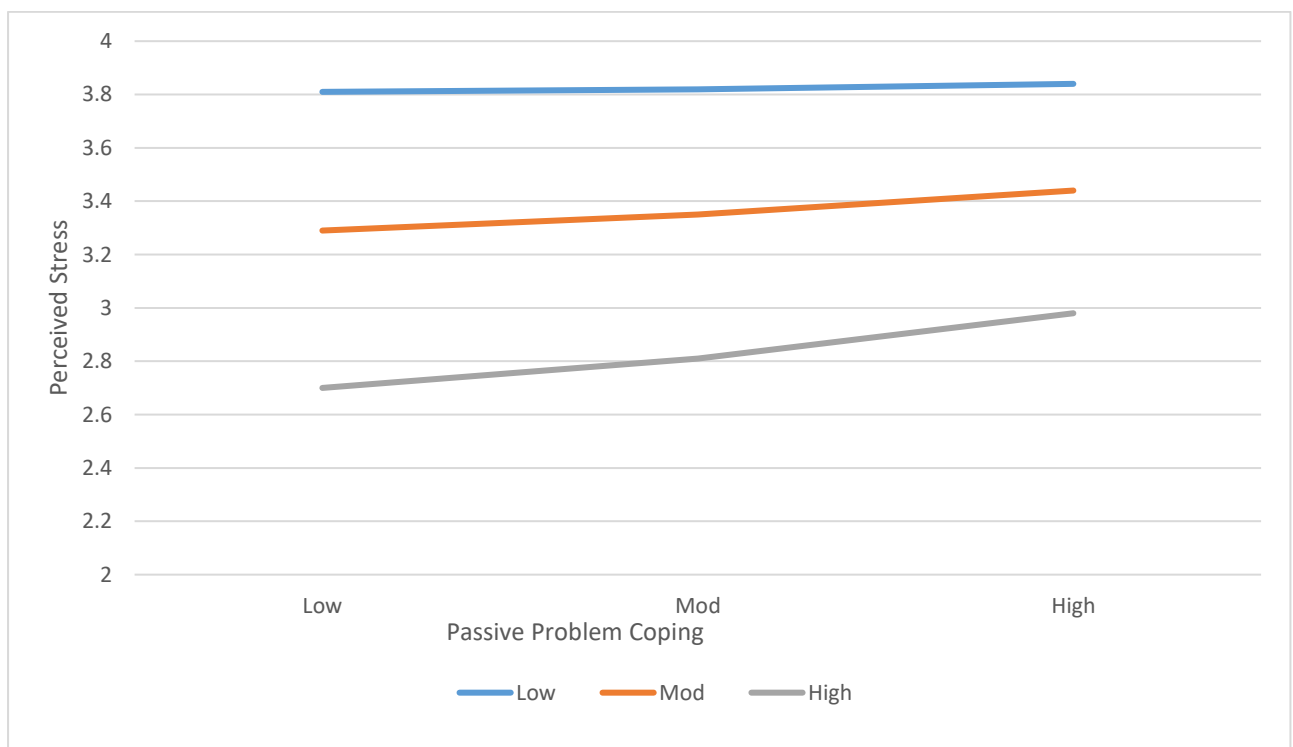
**Figure 7: Interaction Plot – Sense of Coherence, Active Problem Coping and Perceived stress**

### **Does Sense of Coherence moderate the relationship between Passive Problem Coping and Perceived Stress?**

The model summary shows that approximately 51% of the variance in Perceived stress was accounted for by the predictors ( $r^2 = 0.51$ ). SOC moderated the relationship between stress and PPC ( $b=0.12$  and  $p=0.01$ ). Figure 13 shows an interaction effect, that as SOC decreased, stress levels increased as the usage of PPC increased. The conditional effects of X and Y at values of the moderator, shows that at low levels of SOC, the coefficient was not significant, which means that irrespective of the degree of PPC, the degree of stress was the same and this was higher than when the SOC was medium or high. For medium and high SOC, those students who used PPC got more stressed as the degree of PEC increased.

**Table 11: Sense of Coherence on Passive Problem Coping and Perceived Stress**

|                                                                            | R    | R <sup>2</sup> | R <sup>2</sup><br>Change | B     | SE   | T      | p-<br>value |
|----------------------------------------------------------------------------|------|----------------|--------------------------|-------|------|--------|-------------|
| <b>Model Summary</b>                                                       |      |                |                          |       |      |        |             |
|                                                                            | 0.71 | 0.51           |                          |       |      |        | 0.00        |
| <b>Model</b>                                                               |      |                |                          |       |      |        |             |
| Passive Problem Coping (PPC)                                               |      |                |                          | 0.12  | 0.05 | 2.39   | 0.02        |
| Sense of Coherence (SOC)                                                   |      |                |                          | -0.58 | 0.03 | -16.60 | 0.00        |
| Interaction (PPC x SOC)                                                    |      |                | 0.01                     | -0.12 | 0.05 | 2.48   | 0.01        |
| <b>Conditional Effects of PPC on<br/>Stress at values of the moderator</b> |      |                |                          |       |      |        |             |
| Low SOC                                                                    |      |                |                          |       | 0.06 | 0.43   | 0.67        |
| Medium SOC                                                                 |      |                |                          |       | 0.05 | 2.36   | 0.02        |
| High SOC                                                                   |      |                |                          |       | 0.07 | 3.18   | 0.00        |

**Figure 8: Interaction Plot – Sense of Coherence, Passive Problem Coping and Perceived Stress**

## **CHAPTER 5: DISCUSSION, CONCLUSIONS, PRACTICAL IMPLICATIONS, LIMITATIONS AND DIRECTIONS FOR FURTHER STUDIES**

The primary objective of this study was to examine the relationship between stress, Sense of Coherence and coping strategies among medical and psychology students at the selected South African university. More specifically, it examined whether SOC moderated the relationship between stress and stress coping components. The study assessed whether Salutogenic factors buffered the relationship between stress and four components of stress coping strategies. This chapter will discuss the overall results which were obtained from the current study in the context of previous findings and literature.

### ***SENSE OF COHERENCE ON PERCEIVED STRESS***

According to Table 7, SOC had a significant negative and strong relationship with Perceived stress. This meant that high levels of SOC decreased the levels of stress among students. This is consistent with previous research which revealed that SOC is negatively associated with Perceived stress (Nielsen & Hansson, 2007). Similar studies examining college students stress showed that SOC was significantly related to psychological health and inversely related to stress (Chu, Khan, Jahn and Kraemer, 2016; Baker, 2003; Darling, McWey, Howard, & Olmstead, 2007).

The results also corresponded with past research studies who established that SOC was significantly related to health behaviours and mental health among medical and non-medical students (Mirza, Perret-Clermont, Tartas, & Iannaccone, 2009). A similar Japanese study by Takayama et al., (1999) also found that SOC was negatively associated with stressful life events and positively associated with psychological health (Bonacci et al., 2012).

### **Meaningfulness on Perceived Stress**

Table 5 reflects that there was a significant positive strong relationship between meaningfulness and Perceived stress. This meant that an increase in meaningfulness decreases the levels of stress. Therefore, the extent to which individuals can challenge or have a voice on what is around them, has a potential impact on the degree of their meaningfulness. These results are consistent with a study conducted in 2017 by Hashimoto, Nishiyama, Suzuki, Todokoro and Furuichi, which found that students with a low level of meaningfulness had a poor academic performance and a low level of subjective well-being (Antonovsky, 1987). However, this current study used the full scale of SOC since the components can only partially contribute to an individual's Sense of Coherence.

### **Manageability on Perceived Stress**

According to Table 5, manageability and stress had a significant negative relationship ( $r=-0.67$ ,  $p<0.05$ ). High levels of manageability indicated low levels of stress. This meant that students were required to take stressful events in their lives as manageable. Hashimoto et al., (2017) suggested that people with a high score in manageability tend to be less prone to stress and hence achieve academically. However, the full scale was used in this study since it influences individuals' wellbeing in totality, as per what the developer intended.

### **Comprehensibility on Perceived Stress**

Comprehensibility and Perceived stress showed a significant strong negative relationship ( $r=0.64$ ;  $p<0.05$ ) as shown in Table 5. An individual with a higher level of comprehensibility can deal with life's demands in a less stressful way. Results of this study correspond with past research studies, which reported that low comprehensibility scores were associated with students with poor academic performance and low levels of well-being which suggest high stress levels (Hashimoto et al., 2017). However, the full scale of SOC can influence the well-being of individuals in totality than the components.

## ***COPING STRATEGIES ON PERCEIVED STRESS***

### **Active Emotional Coping on Perceived Stress**

Results in Table 6 shows that there is a significant negative relationship between stress and Active Emotional Coping ( $r=-0.31$ ;  $p<0.05$ ). The increase in AEC results in the decrease in stress levels. This corresponds with what was found in some previous research studies where emotional coping was found to be effective in lowering stress levels (Ryan, 2013).

### **Passive Emotional Coping on Perceived Stress**

According to Table 6, PEC has a significant positive association with stress ( $r=0.49$ ;  $p<0.05$ ). High levels of PEC result in high levels of stress. This is therefore consistent with previous research studies, Passive Emotional Coping was significantly correlated with Perceived stress, indicating that students who use more of this type of coping strategy are more likely to experience higher levels of stress than their counterpart (K. Ryan, 2013)

### **Active Problem Coping on Perceived Stress**

APC Strategies have a significant negative relationship with stress ( $r=-0.31$   $p<0.05$ ) as shown in Table 6. High levels of APC are associated with low levels of stress.

### **Passive Problem Coping on Perceived Stress**

Table 6 shows that there was a significant positive association between PPC and stress ( $r=0.33$ ;  $p<0.05$ ). An increase in PPC would mean an increase in Perceived stress levels. This is consistent with the findings reported by Ryan (2013) which found that PEC was significantly correlated with Perceived stress, indicating that students who reported high use of these coping strategies were more likely to experience higher levels of stress.

## ***SENSE OF COHERENCE AND COMPONENTS OF COPING STRATEGIES***

### **Active Emotional Coping and Sense of Coherence**

AEC has a significant positive relationship with SOC ( $r=0.43$ ;  $p<0.05$ ) as shown in Table 7. This means that individuals with a strong SOC are associated with more AEC strategies than those with a low SOC.

### **Passive Emotional Coping and Sense of Coherence**

Results in Table 7 shows that PEC has a significant negative relationship with SOC ( $r=-0.55$ ;  $p<0.05$ ). Individuals who score low on the SOC choose to use more PEC strategies than those who have a strong SOC.

### **Active Problem Coping and Sense of Coherence**

There is a significant positive relationship between SOC and APC, see Table 7 ( $r=0.46$ ;  $p<0.05$ ). Students with a high SOC choose to use more APC strategies than those who have a lower SOC. These results are consistent with some past research studies which suggested that individuals with a greater SOC are more likely to adopt adaptive strategies when responding to a stressor (Ohtaki et al., 2017). They go on to argue that the likelihood of a positive outcome is enhanced, and detrimental effects of stress are reduced.

### **Passive Problem Coping and Sense of Coherence**

SOC has a significant negative association with PPC, see Table 11 ( $r=-0.37$ ;  $p\text{-value}<0.05$ ). Students with a weak SOC tend to use more PPC than students with a strong SOC.

## ***THE MODERATING ROLE OF SENSE OF COHERENCE***

Results indicated that SOC moderates the relationship between all coping strategies components except for the AEC.

### **Does Sense of Coherence moderate the relationship between Active Emotional Coping and Perceived Stress?**

Results of this study shows that SOC does not moderate the relationship between AEC and Perceived stress, as indicated in Table 8 ( $b=-0.1$ ;  $p>0.05$ ). This means that students' SOC did not influence their choice of active coping strategies and stress levels. This also explains that the presence of a SOC did not change the impact of Active Problem Coping on Perceived stress levels. However, students with a lower SOC showed higher levels of stress while those with higher SOC showed low stress levels.

### **Does Sense of Coherence moderate the relationship between Passive Emotional Coping and Perceived Stress?**

Results in Table 9 demonstrated that SOC had moderating effects on the relationship between PEC and Perceived stress ( $b=0.01$ ;  $p<0.05$ ). Figure 6 established an enhancing effect, that as SOC decreased, stress levels increased, and the use of PEC increased. This indicated that students with a weak SOC, irrespective of the degree of PEC strategies, had higher stress levels had than those with medium and high SOC. Students with medium and high SOC became more stressed as the PEC increased. This is consistent with the literature which states that the weaker the SOC, the lesser the ability to cope with Perceived stress and burnout (Antonovsky, 1987; Maturure, 2016).

### **Does Sense of Coherence moderate the relationship between Active Problem Coping and Perceived Stress?**

SOC moderated the relationship between APC and Perceived stress as indicated in Table 10 (interaction  $b=-0.09$ ;  $p<0.05$ ). Figure 7 showed an enhancing effect, so that as SOC

increased, stress levels decreased, and the use of APC increased. This suggested that students with a strong SOC used more of the APC and had the lowest stress levels.

### **Does Sense of Coherence Moderate the relationship between Passive Problem Coping and Perceived Stress?**

Results indicated that SOC moderated the relationship between PPC and Perceived stress ( $b=0.12$ ;  $p<0.05$ ). Figure 8 indicated an enhancing effect, such that as SOC decreased, stress levels increased, and the use of PPC strategies increased. At low SOC, stress levels were similar for low, moderate and high use of PPC. Students with a medium and high SOC were less stressed than those with low SOC, indicating that SOC does influence how students cope with stress.

### ***ARE THERE ANY DIFFERENCES BETWEEN STRESS LEVELS OF MEDICAL AND NON-MEDICAL STUDENTS AT THE SELECTED SOUTH AFRICAN UNIVERSITY?***

Results suggested that there were no differences ( $p>0.05$ ) between the stress levels of medical and psychology students at the selected South African University. This is inconsistent with what other research studies found that medical students are much more highly stressed than non-medical students (Saipanish, 2003; Yusoff, Rahim and Yaacob, 2010).

This suggests that medical school at the selected South African university might not be more stressful than other schools, which is in contrast with other research studies. There could be, however, other factors which determine stress levels than just the complexity of the program. Past research indicates that stress levels among medical students were determined by gender and the financial status of students (Shariati, Yunesian, & Vash, 2007). In addition, past research studies do not show strong evidence on the comparison between the stress levels of medical and non-medical students. Moreover, there could be many other factors that could interfere with the results and lead to inconsistencies, such as the time when data collection was done, the measuring instruments used, the students' state of mind during data collection and the university environment at the time

of collection. There were, also, no significant differences in stress levels between the different racial groups at the selected South African university.

However, there were significant differences between stress levels of female and male students which indicate that gender does influence the stress levels of students. This is consistent with other research findings which found that female students are more stressed than male students and that they have more suicidal thoughts than men (Castillo & Schwartz, 2013; Dusser, Romo & Leboyer, 2009; Shariati, Yunesian & Vash, 2007).

There were also significant differences between students with children and those without children, and single and married students. Students with children were more stressed, maybe due to more responsibilities added by children, which could increase stress levels. Single students were also more highly stressed than married students. This could have been caused by the fact that single students were still in insecure relationships, which might lead to more anxiety, uncertainty and stress than their counterparts who have settled in secured relationship. Moreover, some single students could be stressed due to broken relationships.

## ***PRACTICAL IMPLICATIONS***

This study's findings suggested that there is need for universities to strategise prevention and treatment intervention programs for preventing high stress levels (Friedman, 2014; Providas, 2016). The results also show that students might need assistance to prevent the adoption of Passive Coping Strategies when dealing with stressful events. Universities should promote the adoption of Active Coping Strategies by students, since that would help reduce their stress levels. Students should also be encouraged to find ways of developing their generated resistance resources in order to strengthen their SOC (Lindström & Eriksson, 2010).

The moderating role of SOC, indicated by the results of this study, demonstrates that if universities could increase the SOC of students, it would assist them in choosing Active

Coping Strategies which would, in turn, reduce their overall stress levels. SOC is a health-promoting resource which develops before the age of thirty, and equips individuals with the ability to deal with environmental strain and stressful events (Chu, Khan, Jahn, & Kraemer, 2016).

Most university students are less than thirty years old, which means that this level of education is the most relevant stage for developing the students' GRRs. Providing salutogenic training or awareness programs designed to increase the strength of the students' SOC within the university context would benefit students and lead to the reduction of stress levels (Langeland, Wahl, Kristoffersen, Nortvedt, & Hanestad, 2007). Three studies have demonstrated the possibility of salutogenic training programs with first year college students and the general population (Davidson, Fieldman & Margalit, 2012; Silver, 2013).

The training sessions could emphasise comprehensibility which equips students with the confidence that stressful events can be managed and that there are flexible choices of strategies (Silver, 2013). It would also give students assurance that the demands they are facing are challenges that are worthy of investment and engagement.

Another study which examined the association of stress and SOC among 3500 students in Denmark, found that there was need to introduce programs which boost the SOC of students (Nielsen & Hansson, 2007). It was also found that students with low levels of SOC had low immune systems. Universities could also offer SOC and stress coping workshops as part of the orientation program to prepare students for potential stressful events and provide them with the necessary skills for adapting to their new environment (Mayer & Boness, 2012). They could use interventions and training modules published by the Bahrs and Matthessen in 2007, which boosts the SOC students (Bahrs et al., 2007).

In Germany, the Team Ombuds Model was reported as an effective intervention model that increases the SOC and trans-cultural competence of students and educational professionals (Mayer & Boness, 2012). In this intervention programme the learners created teams called ombuds and in these teams they learnt how to improve communication between teachers and learners, resolve conflicts and promote

networking (Mayer & Boness, 2012). It proved to be an effective way to strengthen the teachers and learners' general resistance resources as well as developing the three components of SOC, comprehensibility, manageability and meaningfulness.

SOC and stress coping awareness programmes could also be incorporated into the individual therapy which is offered to students who are going through difficult challenges and psychological distress or depression. This would assist them in finding ways of reversing the harm that might have already happened and prepare them for future challenges.

Since the results show that SOC is negatively associated with Perceived stress, universities could decrease the levels of stress by encouraging physical exercise, reducing social isolation and nurturing social support. All of these have been found to boost SOC (Chu et al., 2016). These could include the Feldenkrais method, body awareness therapy, mind-body medicine interventions, cognitive intervention practices, and conventional physiotherapy (Mayer & Boness, 2012). Additionally, load balance, consistency and participation in socially valued decision making was found to provide the foundation for the three components of SOC, manageability, comprehensibility and meaningfulness (Chu et al., 2016).

Universities could also educate students about the possible stressors and challenges during their early days at the institutions. This would prepare them in coping with any challenge they encounter during their studies. This could be done during the orientation week or by organising awareness programs and workshops specifically focused on this. This would also assist students to adjust and adapt to the new environment easily, since they would be prepared and ready to face stressful events in their academic life.

Universities could also identify common students' stressors which could serve as a guide during the designing of prevention and treatment intervention strategies of ensuring student well-being (Providas, 2016). Additionally, they could design questionnaires which are given to students to find out more information about obstacles and barriers that hinder them from coping with university demands and stressful events.

Individuals react to stressful events such as academic workload by choosing relevant coping strategies in order to prevent high levels of stress. Universities could incorporate modules on organising skills, active stress coping or stress reduction strategies and time management skills in their orientation workshops or salutogenic workshops. This would prepare students for possible academic demands and challenges (Ryan, 2013).

Student counsellors could be trained so that they can create awareness of academic stressors, coping strategies and possible available GRRs. Student counsellors can be very effective since they associate with fellow students and know exactly what the students are currently facing (Russell et al., 2016). Research indicated that 80% of students increased their level of well-being when the educational climate and educational experiences were positive (Weare, 2007).

## **CONCLUSIONS**

Stress can have a negative impact on the mental health of students which, in turn, affects their academic performance. Universities should develop intervention techniques to keep stress levels of students at a minimum level. This would not be possible without understanding factors influencing high stress levels. This research aimed at examining the relationship between stress, Sense of Coherence and coping strategies among medical and psychology students at a South African university. It is the only study that investigates the moderating role of SOC within a university context, in South Africa.

Based on the findings of this study, SOC moderated the relationship between Perceived stress and the three components of stress coping strategies, PEC, APC and PPC but not for AEC. These results were unexpected, taking the available literature into consideration, but it could be due to the way in which Active Emotional Coping was operationalised in this study. These results demonstrated the importance of SOC in determining stress levels and the choice of coping strategies. SOC influences the type of coping strategies that students adopt to deal with stressful academic situations. The type of coping strategies a student adopts determines their stress levels. Therefore, universities should endeavour to

design stress reduction interventions which strengthen the students' SOC and assist them with the development of Active Coping Strategies to reduce stress levels.

Additionally, results of the current study found that medical school at the selected South African University does not appear to be as stressful as previous research suggested.

The inconsistency of these findings could be because stress levels are determined by several factors. These factors include the time of data collection, the university's environment, individual factors and the structure and complexity of the course curriculum of the university. It could well be that the most highly stressed medical school students were not available to participate in the current study.

Students who had children and those who were married had significantly higher stress levels than those who were single and those without children. This could mean that having more responsibilities at home increased the students' stress levels. This demonstrated that students' individual factors which are not academic related, can also elevate their stress levels, and universities need to be aware of these factors so that they can devise stress reduction techniques, catering for that group of students.

In conclusion, the current research findings suggest that a student who has a strong SOC is likely to choose Active Coping Strategies in response to a stressful academic event or an environmental strain and this would result in lower stress levels and an enhanced well-being. Students with a strong SOC are committed to their studies and are motivated to do their academic work. They take stressful events as meaningful, manageable and challenges worthy of investment. The findings also demonstrate that students with a weak SOC are likely to choose Passive Coping Strategies which would result in high levels of stress. Such students tend to be incompetent and have increased burnout, diminished student wellbeing, reduced engagement and lack of enthusiasm and resilience.

## ***LIMITATIONS OF THE CURRENT STUDY AND DIRECTIONS FOR FUTURE RESEARCH***

Majority of the students who responded were from the psychology department although the questionnaires were distributed online to both medical and psychology students. This might have affected the results by biasing them towards the psychology students.

Future research could possibly address this by distributing the questionnaires to many departments in the medical faculty and by using social networking sites to ensure a more equally distributed cohort of subjects.

Moreover, the study was limited to a selected university in South Africa, predominantly women (78.7% female and 8% males). This affects the generalisability of the results to other university students in South Africa. Several universities across South Africa should be included in future research. The data was collected at a single time (cross-sectional), so it is impossible to draw conclusions of the cause and effect or changes in students' stress levels as they unfold overtime.

A further limitation arises from the stress coping inventory used. The scale had a reliability of 0.6 which is questionable. Previous research studies found that the scale's reliability is above 0.8. Furthermore, the CFA could not confirm the structures of the subscales. This could be due to differences in how developers and students interpreted certain terms. Students could perceive 'looking for religious hope and comfort' or 'drinking' as active ways of coping while the developer considered this as passive ways of coping. Future research could investigate in more depth the causes of this inconsistency.

Another limitation concerned the type of Perceived stress scale used which might have affected the results. The Perceived stress scale was not specifically designed for measuring stress levels for students. It was designed for the general population. Future studies could consider using a scale specifically for measuring academic stress. Additionally, future studies could also consider carrying out a mixed method to gain a deeper understanding of the topic. More in-depth data could be collected through focus groups, short interviews and open-ended questions to understand the topic better.

Finally, the current study used non-probability convenience sampling strategy, which may have promoted volunteer bias (Rosnow & Rosenthal, 2005).

Only certain students who were willing to participate were included in the research and the very students who were experiencing high levels of stress were unlikely to volunteer to participate in extra activities (Cozby & Bates, 2009).

## REFERENCE LIST

- Abdulghani, H. M., Al-Drees, A. A., Khalil, M. S., Ahmad, F., Ponnampuruma, G. G., & Amin, Z. (2014). What factors determine academic achievement in high achieving undergraduate medical students? A qualitative study. *Medical teacher*, 36(sup1), S43-S48.
- Abubakar, A., Hilman, H., & Kaliappen, N. (2018). New Tools for Measuring Global Academic Performance. *SAGE Open*, 8(3), 2158244018790787.
- Ahern, N. R., & Norris, A. E. (2011). Examining factors that increase and decrease stress in adolescent community college students. *Journal of paediatric nursing*, 26(6), 530-540.
- Ahn, D., Park, G., Baek, K. J., & Chung, S.-I. (2007). Academic motivation, academic stress, and perceptions of academic performance in medical students. *Korean Journal of Medical Education*, 19(1), 59-71.
- Akram, A., Mohamad, N., Meerah, T. S. M., ZamZam, R., & Abdullah, D. (2012). A pilot study-an action research to acquire clinical skill. *Procedia-Social and Behavioral Sciences*, 60, 236-240.
- Albertsen, K., Nielsen, M., & Borg, V. (2001). The Danish psychosocial work environment and symptoms of stress: The main, mediating and moderating role of sense of coherence. *Work & stress*, 15(3), 241-253.
- Amirkhan, J. H., & Greaves, H. (2003). Sense of coherence and stress: The mechanics of healthy disposition. *Psychology and Health*, 18(1), 31-62.
- Amponsah, M., & Owolabi, H. (2011). Perceived stress levels of fresh university students in Ghana: A case study. *Journal of Education, Society and Behavioural Science*, 153-169.
- Annon, P., Lukadi, M., & Warner, A. (2018). Establishing a community of practice to aid the development of teaching fellows at GSM London. *Higher Education Review*, 50(2).
- Antonovsky, A. (1987). *Unraveling the mystery of health: How people manage stress and stay well*: Jossey-bass.
- Antonovsky, A. (1993). The structure and properties of the sense of coherence scale. *Social science & medicine*, 36(6), 725-733.

- Asani, M., & Usman, S. (2018). Perception of Learning Environment among Clinical Students of a Tertiary Hospital. *South-East Asian Journal of Medical Education*, 12(1).
- Aspinwall, L. G., & Taylor, S. E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychological bulletin*, 121(3), 417.
- Bahrs, O., Heim, S., Kalitzkus, V., Matthiessen, P., Meister, P., & Müller, H. (2007). Salutogenetic Orientation in General Practice: Quality Circles as Training-and Research Tool. *Balint-Journal*, 8(1), 9-15.
- Baker Jr, H. A. (2013). *Modernism and the Harlem renaissance*: University of Chicago Press.
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of managerial psychology*, 22(3), 309-328.
- Baqutayan, S. M. S. (2015). Stress and coping mechanisms: A historical overview. *Mediterranean Journal of Social Sciences*, 6(2 S1), 479.
- Bartlett, A., & Knoblock, L. (1988). A self report questionnaire for updating college students' study skills. *Journal of Reading*, 31(4), 361-364.
- Berjot, S., Altintas, E., Grebot, E., & Lesage, F.-X. (2017). Burnout risk profiles among French psychologists. *Burnout research*, 7, 10-20.
- Bezuidenhout, A., & Cilliers, F. (2011). Age, burnout, work engagement and sense of coherence in female academics at two South African universities. *South African Journal of Labour Relations*, 35(1), 61-80.
- Biggs, A., Brough, P., & Drummond, S. (2017). Lazarus and Folkman's psychological stress and coping theory. *The handbook of stress and health*, 349-364.
- Blanche, M. T., Blanche, M. J. T., Durrheim, K., & Painter, D. (2006). *Research in practice: Applied methods for the social sciences*: Juta and Company Ltd.
- Bonacci, J., Vicenzino, B., Spratford, W., & Collins, P. (2014). Take your shoes off to reduce patellofemoral joint stress during running. *Br J Sports Med*, 48(6), 425-428.
- Bracha, E., & Hoffenbartal, D. (2015). The Existence of Sense of Coherence in Teaching Situations Among Student-teachers. *Procedia-Social and Behavioral Sciences*, 180, 722-729.

- Brausch, A. M., & Decker, K. M. (2014). Self-esteem and social support as moderators of depression, body image, and disordered eating for suicidal ideation in adolescents. *Journal of Abnormal Child Psychology*, 42(5), 779-789.
- Breslin, F. C., Hepburn, C. G., Ibrahim, S., & Cole, D. (2006). Understanding Stability and Change in Psychological Distress and Sense of Coherence: A Four-Year Prospective Study 1. *Journal of Applied Social Psychology*, 36(1), 1-21.
- Bugaj, T., Cranz, A., Junne, F., Erschens, R., Herzog, W., & Nikendei, C. (2016). Psychosocial burden in medical students and specific prevention strategies. *Mental Health & Prevention*, 4(1), 24-30.
- Bujang, M. A., Omar, E. D., & Baharum, N. A. (2018). A Review on Sample Size Determination for Cronbach's Alpha Test: A Simple Guide for Researchers. *The Malaysian journal of medical sciences: MJMS*, 25(6), 85.
- Carver, J. (2011). *Boards that make a difference: A new design for leadership in nonprofit and public organizations* (Vol. 6): John Wiley & Sons.
- Castillo, L. G., and Schwartz, S. J. (2013). Introduction to the special issue on college student mental health. *J. Clin. Psychol.* 69, 291–297. doi: 10.1002/jclp.21972.
- Chan, M. F., Creed, D. K., Chua, T. L., & Lim, C. C. (2011). Exploring the psychological health related profile of nursing students in Singapore: a cluster analysis. *Journal of Clinical Nursing*, 20(23-24), 3553-3560.
- Chew-Graham, C. A., Rogers, A., & Yassin, N. (2003). 'I wouldn't want it on my CV or their records': medical students' experiences of help-seeking for mental health problems. *Medical education*, 37(10), 873-880.
- Chu, J. J., Khan, M. H., Jahn, H. J., & Kraemer, A. (2016). Sense of coherence and associated factors among university students in China: cross-sectional evidence. *BMC public health*, 16(1), 336.
- Coetzee, M., & Oosthuizen, R. M. (2012). Students' sense of coherence, study engagement and self-efficacy in relation to their study and employability satisfaction. *Journal of psychology in Africa*, 22(3), 315-322.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of health and social behavior*, 385-396.
- Darling, C. A., McWey, L. M., Howard, S. N., & Olmstead, S. B. (2007). College student stress: The influence of interpersonal relationships on sense of coherence. *Stress*

- and Health: Journal of the International Society for the Investigation of Stress*, 23(4), 215-229.
- Davidson, O. B., Feldman, D. B., & Margalit, M. (2012). A focused intervention for 1st-year college students: Promoting hope, sense of coherence, and self-efficacy. *The Journal of Psychology*, 146(3), 333-352.
- Deasy, C., Coughlan, B., Pironom, J., Jourdan, D., & Mannix-McNamara, P. (2014). Psychological distress and coping amongst higher education students: A mixed method enquiry. *Plos one*, 9(12), e115193.
- Delport, M. (2018). Determining levels of coping and emotional intelligence in psychology students at the University of the Western Cape: A quantitative study.
- Duncan, R. G., Freidenreich, H. B., Chinn, C. A., & Bausch, A. (2011). Promoting middle school students' understandings of molecular genetics. *Research in Science Education*, 41(2), 147-167.
- Dusser, I., Romo, L., and Leboyer, M. (2009). Construction and evaluation of a stress management group for patients with bipolar disorder. *J. Thér. Comport. Cogn.* 19, 56–60. doi: 10.1016/j.jtcc.2009.08.002.
- Du Plessis, L., & Gerber, D. (2012). Academic preparedness of students-an exploratory study. *TD: The Journal for Transdisciplinary Research in Southern Africa*, 8(1), 81-94.
- Dusser, I., Romo, L., and Leboyer, M. (2009). Construction and evaluation of a stress management group for patients with bipolar disorder. *J. Thér. Comport. Cogn.* 19, 56–60. doi: 10.1016/j.jtcc.2009.08.002.
- El Ansari, W., & Stock, C. (2010). Is the health and wellbeing of university students associated with their academic performance? Cross sectional findings from the United Kingdom. *International journal of environmental research and public health*, 7(2), 509-527.
- Estevez, N. (2010). *Perceived stress, coping strategies and health behaviors among female graduate students*: Southern Connecticut State University.
- Fish, C., & Nies, M. A. (1996). Health promotion needs of students in a college environment. *Public Health Nursing*, 13(2), 104-111.
- Friedman, G. (2014). *Student stress, burnout and engagement*. (Masters Thesis), University of Witwatersrand, Johannesburg, South Africa.

- Hashimoto, M., Nishiyama, M., Suzuki, E., Tadokoro, N., & Furuichi, T. (2017). Relationship Between Lifestyle and Sense of Coherence (SOC) in Medical Students During the First Two Years and Passing the National Examination for Medical Practitioners. *Dokkyo Journal of Medical Sciences*, 44(1), 119-123.
- Gopi, A., Pradeep, V., & OC, S. H. (2018). Prevalence and Factors Associated with Depression among the Students of a Medical College in Kerala. *Indian Journal of Public Health Research & Development*, 9(12).
- Govender, P., Mkhabela, S., Hlongwane, M., Jalim, K., & Jetha, C. (2015). OT student's experiences of stress and coping. *South African Journal of Occupational Therapy*, 45(3), 34-39.
- Green, S., & Salkind, N. (2011). *Using SPSS for the MacIntosh and Windows: Analyzing and understanding data*: Boston, MA: Prentice Hall.
- Greenglass, E. R., & Fiksenbaum, L. (2009). Proactive coping, positive affect, and well-being: Testing for mediation using path analysis. *European psychologist*, 14(1), 29-39.
- Hawley, W. D., Cabrera, N., Milem, J., & Marx, R. (2012). An empirical analysis of the effects of Mexican American Studies participation on student achievement within Tucson Unified School District. *PhD diss., The University of Arizona*.
- Hewstone, M., Ramiah, A. A., Schmid, K., Floe, C., Zalk, M. v., Wölfer, R., & New, R. (2018). Influence of segregation versus mixing: Intergroup contact and attitudes among White-British and Asian-British students in high schools in Oldham, England. *Theory and Research in Education*, 16(2), 179-203.
- Hj Ramli, N., Alavi, M., Mehrinezhad, S., & Ahmadi, A. (2018). Academic stress and self-regulation among university students in Malaysia: Mediator role of mindfulness. *Behavioral Sciences*, 8(1), 12.
- Holahan, C. J., & Moos, R. H. (1987). Personal and contextual determinants of coping strategies. *Journal of personality and social psychology*, 52(5), 946.
- Hu, B., Liu, X., Yin, S., Fan, H., Feng, F., & Yuan, J. (2015). Effects of psychological stress on hypertension in middle-aged Chinese: a cross-sectional study. *PloS one*, 10(6), e0129163.

- Jackson, D. (2017). Exploring the challenges experienced by international students during work-integrated learning in Australia. *Asia Pacific Journal of Education*, 37(3), 344-359.
- Jama, M. P., Mapesela, M. L., & Beylefeld, A. A. (2008). Theoretical perspectives on factors affecting the academic performance of students. *South African Journal of Higher Education*, 22(5), 992-1005.
- Kim, S. M. (2017). Factors Affecting Nursing Students' Activeness in Clinical Education. *Perspectives in Nursing Science*, 14(1), 32-36.
- Kadziolka, M. J., Di Pierdomenico, E.-A., & Miller, C. J. (2016). Trait-like mindfulness promotes healthy self-regulation of stress. *Mindfulness*, 7(1), 236-245.
- Keady, W. M. (1999). Secondary students' skills of measuring liquid volume and understanding of uncertainty of data (Masters Thesis). Edith Cowan University, Perth, Western Australia.
- Kennard, C. (2008). *Differences in male and female wiki participation during educational group projects*. Paper presented at the EdMedia+ Innovate Learning.
- Langeland, E., Wahl, A. K., Kristoffersen, K., Nortvedt, M. W., & Hanestad, B. R. (2007). Quality of life among Norwegians with chronic mental health problems living in the community versus the general population. *Community mental health journal*, 43(4), 321-339.
- Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual review of psychology*, 44(1), 1-22.
- Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of personality*, 1(3), 141-169.
- Lee, J., & Graham, A. V. (2001). Students' perception of medical school stress and their evaluation of a wellness elective. *Medical education*, 35(7), 652-659.
- Leedy, P. D., & Ormrod, J. E. (2013). The nature and tools of research. *Practical research: Planning and design*, 1-26.
- Lemus-Cruz, C. V., González-Pérez, G., Sánchez-Orozco, A. J., Iñiguez-Soto, M., & Castellanos-Franco, T. E. (2017). Orbital pilocytic astrocytoma: case report. *Revista Medica MD*, 8(1), 81-84.
- Lewin, T., & Mawoyo, M. (2014). *Student access and success: Issues and interventions in South African universities*. Inyathelo.

- Lin, Y. M., & Chen, F. S. (2010). Academic stress inventory of students at universities and colleges of technology. *World Transactions on Engineering and Technology Education*, 7(2), 157-162.
- Lindmark, U., Stenström, U., Gerdin, E. W., & Hugoson, A. (2010). The distribution of "sense of coherence" among Swedish adults: A quantitative cross-sectional population study. *Scandinavian Journal of Public Health*, 38(1), 1-8.
- Lindström, B., & Eriksson, M. (2010). A salutogenic approach to tackling health inequalities *Health assets in a global context* (pp. 17-39): Springer.
- Malefo, V. (2000). Psycho-social factors and academic performance among African women students at a predominantly white university in South Africa. *South African Journal of Psychology*, 30(4), 40-45.
- Marshall, J., & Cooper, C. L. (1979). Work experiences of middle and senior managers: The pressure and satisfactions. *Management International Review*, 81-96.
- Mason, H. D. (2017). Stress-management strategies among first-year students at a South African University: A qualitative study. *Journal of Student Affairs in Africa*, 5(2), 131-149.
- Matthieu, M. M., & Ivanoff, A. (2006). Using Stress, Appraisal, and Coping Theories in Clinical Practice: Assessments of Coping Strategies After Disasters. *Brief Treatment & Crisis Intervention*, 6(4).
- Maturure, T. (2016). *Burnout, work engagement and sense of coherence in nurses working at a central hospital in KwaZulu-Natal*.
- Mayer, C. H., & Boness, C. M. (2012). *Intercultural mediation & conflict resolution*: ibidem-Verlag/ibidem Press.
- Milojevich, H. M., and Lukowski, A. F. (2016). Sleep and mental health in undergraduate students with generally healthy sleep habits. *PLoS ONE* 11:e0156372. doi: 10.1371/journal.pone.0156372
- Mitrousi, S., Travlos, A., Koukia, E., & Zyga, S. (2013). SPECIALPAPER. *International Journal of Caring Sciences*, 6(2), 131.
- Mirza, N. M., Perret-Clermont, A.-N., Tartas, V., & Iannaccone, A. (2009). Psychosocial processes in argumentation *Argumentation and education* (pp. 67-90): Springer.
- Mokhuane, S. J. (2016). *A security risk management approach to the prevention of theft of platinum group metals: case study of Impala Platinum Mines and Refinery*.

- Moss, S., Prosser, H., Costello, H., Simpson, N., Patel, P., Rowe, S., . . . Hatton, C. (1998). Reliability and validity of the PAS-ADD Checklist for detecting psychiatric disorders in adults with intellectual disability. *Journal of Intellectual Disability Research*, 42(2), 173-183.
- Mouret, G. M. (2002). Stress in a graduate medical degree. *The Medical Journal of Australia*, 177(1), S10.
- Muller, Y., & Rothmann, S. (2009). Sense of coherence and employees' perceptions of helping and restraining factors in an organisation. *SA Journal of Industrial Psychology*, 35(1), 89-98.
- Marshall, J., & Cooper, C. L. (1979). Work experiences of middle and senior managers: The pressure and satisfactions. *Management International Review*, 81-96.
- Münstedt, K., Harren, H., von Georgi, R., & Hackethal, A. (2011). Complementary and alternative medicine: comparison of current knowledge, attitudes and interest among German medical students and doctors. *Evidence-Based Complementary and Alternative Medicine*, 2011.
- Naaldenberg, J., Tobi, H., van den Esker, F., & Vaandrager, L. (2011). Psychometric properties of the OLQ-13 scale to measure Sense of Coherence in a community-dwelling older population. *Health and Quality of Life Outcomes*, 9(1), 37.
- Nagpal, J., Kumar, A., Kakar, S., & Bhartia, A. (2010). The development of quality of life instrument for Indian diabetes patients (QOLID): a validation and reliability study in middle and higher income groups. *J Assoc Physicians India*, 58, 295-304.
- Naidoo, S., Van Wyk, J., Higgins-Opitz, S. B., & Moodley, K. (2014). An evaluation of stress in medical students at a South African university. *South African Family Practice*, 56(5), 258-262.
- Nederman, C. J. (2015). Social and political thought *The Routledge History of Medieval Christianity* (pp. 117-128): Routledge.
- Negga, F., Applewhite, S., & Livingston, I. (2007). African American college students and stress: School racial composition, self-esteem and social support. *College Student Journal*, 41(4).
- Nielsen, A. M., & Hansson, K. (2007). Associations between adolescents' health, stress and sense of coherence. *Stress and Health: Journal of the International Society for the Investigation of Stress*, 23(5), 331-341.

- Nilson, C. (2008). Using the emotion of art to build cohesion, collaboration and empathy between student nurses.
- Ohtaki, Y., Ohi, Y., Suzuki, S., Usami, K., Sasahara, S., & Matsuzaki, I. (2017). Parental bonding during childhood affects stress-coping ability and stress reaction. *Journal of health psychology*, 22(8), 1004-1011.
- Oster, A., Hark, L., Shea, J., & Von Feldt, J. (2005). An educational module designed to teach second-year medical students counseling on behavior change. *Annals of Behavioral Science and Medical Education*, 11, 8-13.
- Petrov, M. E., Lichstein, K. L., and Baldwin, C. M. (2014). Prevalence of sleep disorders by sex and ethnicity among older adolescents and emerging adults: relations to daytime functioning, working memory and mental health. *J. Adolesc.* 37, 587–597. doi: 10.1016/j.adolescence.2014.04.007.
- Providas, N. (2016). *The role of personal resources in the JD-R model within a student-university context*, University of Witwatersrand, Johannesburg, South Africa.
- Prillerman, S. L. (1989). Coping with a stressful transition: A prospective study of Black student adjustment to a predominantly White university (Doctorate thesis). Univesity of California, Los Angeles.
- Rai, A., Sindhu, A., Dudeja, P., Sirohi, Y., & Mukherji, S. (2018). Sense of coherence and self reported health amongst medical students: A cross sectional study. *Medical Journal Armed Forces India*, 74(2), 158-161.
- Rogan, S., Radlinger, L., Portner-Burkhalter, C., Sommer, A., & Schmidtbleicher, D. (2013). Feasibility study evaluating four weeks stochastic resonance whole-body vibration training with healthy female students. *International Journal of Kinesiology and Sports Science*, 1(2), 1-9.
- Rosenbaum, M. (1990). *The role of learned resourcefulness in the self-control of health behavior*: Springer Publishing Co.
- Rosnow, R., & Rosenthal, R. (2005). *Beginning behavioural research: A conceptual primer (5th Eds.)*: Upper Saddle River, NJ: Pearson Hall.
- Rummell, C. M. (2015). An exploratory study of psychology graduate student workload, health, and program satisfaction. *Professional Psychology: Research and Practice*, 46(6), 391.

- Russell, S. J., Hillard, M. A., Balliro, C., Magyar, K. L., Selagamsetty, R., Sinha, M., . . . Zheng, H. (2016). Day and night glycaemic control with a bionic pancreas versus conventional insulin pump therapy in preadolescent children with type 1 diabetes: a randomised crossover trial. *The lancet Diabetes & endocrinology*, 4(3), 233-243.
- Ryan, K. (2013). How problem focused and emotion focused coping affects college students' perceived stress and life satisfaction.
- Ryan, M., & Ryan, M. (2013). Theorising a model for teaching and assessing reflective learning in higher education. *Higher Education Research & Development*, 32(2), 244-257.
- Saipanish, R. (2003). Stress among medical students in a Thai medical school. *Medical teacher*, 25(5), 502-506.
- Salam, A., Yousuf, R., Bakar, S. M. A., & Haque, M. (2013). Stress among medical students in Malaysia: A systematic review of literatures. *Int Med J*, 20(6), 649-655.
- Saleh, D., Camart, N., & Romo, L. (2017). Predictors of stress in college students. *Frontiers in psychology*, 8, 19.
- Sándor, I., Birkás, E., & Gyórfy, Z. (2015). The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Medical Education*, 15(1), 73.
- Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: psychological, behavioural, and biological determinants. *Annu. Rev. Clin. Psychol.*, 1, 607-628.
- Schwarzer, R., & Taubert, S. (2002). *Tenacious goal pursuits and striving toward personal growth: Proactive coping*. Paper presented at the Beyond coping: Meeting goals, visions and challenges.
- Shaikh, B. T., Kahloon, A., Kazmi, M., Khalid, H., Nawaz, K., Khan, N., & Khan, S. (2004). Students, stress and coping strategies: a case of Pakistani medical school. *Education for Health – Abingdon-Carfax Publishing Limited*, 17, 346-353.
- Shariati, M., Yunesian, M., & Vash, J. H. (2007). Mental health of medical students: a cross-sectional study in Tehran. *Psychological reports*, 100(2), 346-354.
- Silver, R. (2013). Coping with College Stress: Does Sense of Coherence Influence the Use of Alcohol and OTC Medication? Salam, A., Yousuf, R., Bakar, S. M. A., & Haque,

- M. (2013). Stress among medical students in Malaysia: A systematic review of literatures. *Int Med J*, 20(6), 649-655.
- Stanton, A. L., Danoff-Burg, S., Cameron, C. L., Bishop, M., Collins, C. A., Kirk, S. B., . . . Twillman, R. (2000). Emotionally expressive coping predicts psychological and physical adjustment to breast cancer. *Journal of consulting and clinical psychology*, 68(5), 875.
- Stoddard, C., Urban, C., & Schmeiser, M. (2017). Can targeted information affect academic performance and borrowing behavior for college students? Evidence from administrative data. *Economics of Education Review*, 56, 95-109.
- Sturmey, P., Newton, J. T., Cowley, A., Bouras, N., & Holt, G. (2005). The PAS-ADD Checklist: independent replication of its psychometric properties in a community sample. *The British Journal of Psychiatry*, 186(4), 319-323.
- Struthers, C. W., Perry, R. P., & Menec, V. H. (2000). An examination of the relationship among academic stress, coping, motivation, and performance in college. *Research in higher education*, 41(5), 581-592.
- Takayama, T., Asano, Y., Yamazaki, Y., Yoshii, K., Nagasaka, Y., Fukada, J., Seki, Y. (1999). Sense of coherence, stressful life events and psychological health. [*Nihon koshu eisei zasshi*] *Japanese journal of public health*, 46(11), 965-976.
- Taylor, N. (2002). Mental models in chemistry: Senior chemistry students' mental models of chemical bonding. *Chemistry Education Research and Practice*, 3(2), 175-184.
- Thwaites, R., & Freeston, M. H. (2005). Safety-seeking behaviours: Fact or function? How we clinically differentiate between safety behaviours and adaptive coping strategies across anxiety disorders? *Behavioural and Cognitive Psychotherapy*, 33(2), 177-188.
- Vally, Z., Cody, B. L., Alsheraifi, S. N., & Albloshi, M. A. (2018). A comparative description of perceived stress and coping strategies among psychology and nonpsychology students in the United Arab Emirates. *Perspectives in psychiatric care*, 54(4), 539-546.
- Van der Colff, J. J., & Rothmann, S. (2009). Occupational stress, sense of coherence, coping, burnout and work engagement of registered nurses in South Africa. *SA Journal of Industrial Psychology*, 35(1), 1-10.

- Van der Merwe, L., Van Zyl, G., Gibson, A. S. C., Viljoen, A., Iputo, J., Mammen, M., . . . Fonn, S. (2016). South African medical schools: current state of selection criteria and medical students' demographic profile. *South African Medical Journal*, 106(1), 76-81.
- Versaavel, L. N. (2014). Canadian Post-Secondary Students, Stress, and Academic Performance—A Socio-Ecological Approach.
- Walker, J., & Almond, P. (2010). *Interpreting statistical findings: a guide for health professionals and students*: McGraw-Hill Education (UK).
- Weare, K. (2007). Delivering health education: The contribution of social and emotional learning. *Health Education*, 107(2), 109-113.
- Wilks, S. E. (2008). Resilience amid academic stress: The moderating impact of social support among social work students. *Advances in social work*, 9(2), 106-125.
- Wong, C. C., Tan, C. M., & Hiew, P. L. (2005). Business Scenarios Assessment in Healthcare and Education for 21 st Century Networks in Asia Pacific. *Proceedings of World Academy of Science. Engineereing and Technology*.
- York, T. T., Gibson, C., & Rankin, S. (2015). Defining and Measuring Academic Success. *Practical Assessment, Research & Evaluation*, 20.
- Yusoff, M. S. B., Rahim, A. F. A., & Yaacob, M. J. (2010). Prevalence and sources of stress among Universiti Sains Malaysia medical students. *The Malaysian journal of medical sciences: MJMS*, 17(1), 30.
- Zemirah, N. L. (2000). *Burnout and clinical psychology graduate students: A qualitative study of students' experiences and perceptions*. ProQuest Information & Learning.
- Hodge-Windover, S. T. (2017). *The Relationship between Stress, Coping Style, and Academic Satisfaction: A Quantitative Study*. Northcentral UniversityER

## APPENDICES

### ***Appendix A: Participant Information Sheet***

Dear Sir/Madam

My name is Fungai Matumba and I am a Masters student in Social and Psychological Research at Wits University in Johannesburg. As part of my studies I have to undertake a research project which investigates stress levels among students and determine the relationship between stress and sense of coherence and coping strategies. The research will also examine differences in stress levels between medical and psychology student.

As part of this project I would like to invite you to take part in answering an on online survey. This activity will involve completing a biographical questionnaire, the Brief Cope questionnaire which measure coping strategies, the Orientation of life questionnaire which measures a sense of coherence and the Perceived Stress questionnaire which measures stress levels and will take around 30 minutes.

You will not receive any direct benefits from participating in this study, and there are no disadvantages or penalties for not participating. You may withdraw at any time or not answer any question if you do not want to. The survey will be completely confidential and anonymous as I will not be asking for your name or any identifying information, and the information you give to me will be held securely and not disclosed to anyone else.

If you have any questions afterwards about this research, feel free to contact me on the details listed below. This study will be written up as a research report which will be available online through the university library website. If you wish to receive a summary of this report, I will be happy to send it to you upon request. If you have any queries, concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (non-medical), [hrec-medical.researchoffice@wits.ac.za](mailto:hrec-medical.researchoffice@wits.ac.za)/[Shaun.Schoeman@wits.ac.za](mailto:Shaun.Schoeman@wits.ac.za)

Yours sincerely,

Fungai Matumba

[titsvalo@gmail.com](mailto:titsvalo@gmail.com), +27 73 637 3588

GILLIAN FILENCHILESCU

[gillian.finchilescu@wits.ac.za](mailto:gillian.finchilescu@wits.ac.za), +27 11 717 4534

***Appendix B: Biographical Questionnaire***

Name.....

Surname.....

Gender.....

Age.....

Home Language.....

Race.....

Education Level.....

Year of study.....

Social economic status.....

Marital status.....

Ethnicity.....

Parents' educational Level.....

Method of paying Fees.....

### ***Appendix C: Stress Coping Style Inventory***

- 1. Completely Disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5 = Strongly agree

How do you deal with it when you face academic stress or problems during this semester?

1 I try to do or think of some things that will make me feel happier and allow myself to relax.

1                      2                      3                      4                      5

2 I try to adjust my mindset and allow myself to be happier.

1                      2                      3                      4                      5

2 I talk with classmates or friends or disclose to my online friends.

1                      2                      3                      4                      5

3 I let myself calm down first and think of how to reconcile the negative emotions.

1                      2                      3                      4                      5

4 I eat and have fun to decrease the stress first.

1                      2                      3                      4                      5

5 I consider it to be a type of self-challenge.

1                      2                      3                      4                      5

6 I do usual things such as watching TV, reading comics, listening to music, sleeping, eating or going out to temporarily forget these frustrating things.

1                      2                      3                      4                      5

7 I tell myself to persevere.

1                      2                      3                      4                      5

8 I give up and blame God for being unfair when I face stress.

1 2 3 4 5

9 I make my friends uncomfortable when they provoke me when I am feeling down.

1 2 3 4 5

10 I do not give in when I argue with my friends.

1 2 3 4 5

11 I put my anger or fretful emotions on others.

1 2 3 4 5

12 I blame myself, retreat or shut myself away when I face stress.

1 2 3 4 5

13 I generalise that I have bad luck when I face stress.

1 2 3 4 5

14 I search and look for related data from the library or the Internet to do my homework.

1 2 3 4 5

15 I discuss issues with teachers, family, seniors or friends and classmates and ask for their opinions.

1 2 3 4 5

16 When I encounter conflicts in my academic study and activities, I will first arrange and plan.

1 2 3 4 5

17 I simplify the question and make it easy to solve.

1 2 3 4 5

18 I use a calm and optimistic attitude to think about how to cope with the problem.

1 2 3 4 5

19 I stay up finishing my homework until midnight.

1 2 3 4 5

20 I leave aside the problem first.

1 2 3 4 5

21 I passively let nature take its course.

1 2 3 4 5

22 I am used to leaving aside the problem and not handling it for the time being.

1 2 3 4 5

23 I decrease my standards and try again with the new standards.

1 2 3 4 5

24 I look for religious hope or comfort for my soul.

1 2 3 4 5

25 The numbers of classes I bunk are becoming more and more.

1 2 3 4 5

26 I make myself numb by drinking alcohol or drug abuse. I leave the problem aside.

1 2 3 4 5

27 I study the subjects I like better when I am in a class I do not like.

1 2 3 4 5

FACTOR A – ACTIVE EMOTIONAL COPING (1-8)

FACTOR B – PASSIVE EMOTIONAL COPING (9-14)

FACTOR C – ACTIVE PROBLEM COPING (15-20)

FACTOR D – PASSIVE PROBLEM COPING (21-28)

### **Appendix D: Orientation to Life Questionnaire**

The following are a series of questions and/or sentences relating to various aspects of life. Please mark the number which best expresses your views concerning the item, with numbers 1 to 7. Please give only one answer to each question.

When you talk to people, do you have the feeling that they don't understand you?

Never 1 2 3 4 5 6 7 Always have this feeling

2 In the past, when you had to do something which depended upon cooperation with others, did you have the feeling that it:

Surely wouldn't get done 1 2 3 4 5 6 7 surely would get done

3. Think of the people with whom you come into contact daily, aside from the ones to whom you feel closest. How well do you know most of them?

You feel that they're strangers 1 2 3 4 5 6 7 you know them very well

4. Do have the feeling that you don't really care about what goes on around you?

Very seldom or never 1 2 3 4 5 6 7 very often

5. Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?

Never happened 1 2 3 4 5 6 7 always happened

6. Has it happened that people whom you counted on disappointed you?

Never happened 1 2 3 4 5 6 7 always happened

7. Life is:

Full of interest 1 2 3 4 5 6 7 completely routine

8. Until now your life has had:

No clear goals or purpose at all 1 2 3 4 5 6 7 very clear goals and purpose

9. Do you have the feeling that you're being treated unfairly?

Very often 1 2 3 4 5 6 7 very seldom or never

10. In the past ten years your life has been:

full of changes without your knowing what will happen next 1 2 3 4 5 6 7 completely consistent and clear

11. Most of the things you do in the future will probably be:

Completely fascinating 1 2 3 4 5 6 7 deadly boring

12. Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

Very often 1 2 3 4 5 6 7 very seldom or never

13. What best describes how you see life:

One can always find a solution to painful things in life 1 2 3 4 5 6 7 There is no solution to painful things in life

14. When you think about your life, you very often:

Feel how good it is to be alive 1 2 3 4 5 6 7 ask yourself why you exist at all

15. When you face a difficult problem, the choice of a solution is:

Always confusing and hard to find 1 2 3 4 5 6 7 always completely clear

16. Doing the things you do every day is:

A source of deep pleasure and satisfaction 1 2 3 4 5 6 7 a source of pain and boredom

17. Your life in the future will probably be:

Full of changes without your knowing what will happen next 1 2 3 4 5 6 7 completely consistent and clear

18. When something unpleasant happened in the past your tendency was:

"to eat yourself up" about it 1 2 3 4 5 6 7 to say " ok that's that, I have to live with it " and go on

19. Do you have very mixed-up feelings and ideas?

Very often 1 2 3 4 5 6 7 very seldom or never

20. When you do something that gives you a good feeling:

it's certain that you'll go on feeling good 1 2 3 4 5 6 7 it's certain that something will happen to spoil the feeling

**21.** Does it happen that you have feelings inside you would rather not feel?

Very often 1 2 3 4 5 6 7 very seldom or never

**22.** You anticipate that your personal life in the future will be:

Totally without meaning or purpose 1 2 3 4 5 6 7 full of meaning and purpose

**23.** Do you think that there will always be people whom you'll be able to count on in the future?

You're certain there will be 1 2 3 4 5 6 7 you doubt there will be

**24.** Does it happen that you have the feeling that you don't know exactly what's about to happen?

Very often 1 2 3 4 5 6 7 very seldom or never

**25.** Many people - even those with a strong character - sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past?

Never 1 2 3 4 5 6 7 very often

**26.** When something happened, have you generally found that:

You overestimated or underestimated its importance 1 2 3 4 5 6 7 you saw things in the right proportion

**27.** When you think of the difficulties you are likely to face in important aspects of your life, do you have the feeling that:

you will always succeed in overcoming the difficulties 1 2 3 4 5 6 7 you won't succeed in overcoming the difficulties.

**28.** How often do you have the feeling that there's little meaning in the things you do in your daily life?

Very often 1 2 3 4 5 6 7 very seldom or never

**29.** How often do you have feelings that you're not sure you can keep under control?

Very often 1 2 3 4 5 6 7 very seldom or never

### **Appendix E: Perceived Stress Scale**

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way. Then respond to each of the following items by marking one number on your answer sheet for each, using the response choices listed just below.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

3. In the last month, how often have you felt nervous and "stressed"?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

5. In the last month, how often have you felt that things were going your way?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

7. In the last month, how often have you been able to control irritations in your life?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

8. In the last month, how often have you felt that you were on top of things?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

9. In the last month, how often have you been angered because of things that were outside of your control?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

\_\_\_0=never    \_\_\_1=almost never    \_\_\_2=sometimes    \_\_\_3=fairly often    \_\_\_4=very often

## Appendix F: Ethics Clearance Form



University of the Witwatersrand, Johannesburg

### ***Ethics Application Form for Human Research Ethics Committee (HREC Non-Medical)*** (Revised December 2012)

Use this form in applying for clearance of research involving human participants

#### Instructions

1. Applications must be submitted as hard copies, one of which must be an original (see checklist below for numbers of copies required). Electronic submissions will not be accepted.
2. All submissions and materials must be typed. Handwritten submissions are **NOT** acceptable.
3. Incomplete applications will **NOT** be considered.
4. Applications will **NOT** be processed if signatures from applicant or supervisor are missing.
5. Photocopying should be done 'back-to-back' to save paper.
6. Glossy and fancy binding is **NOT** necessary.
7. Necessary supporting documents (e.g. *Participant Information Sheet*, *Consent Form*, copies of instruments), must be stapled to the *Ethics Application Form*.

**Complete this checklist to show what documents you have submitted.**

☒ **Check list** **No. of copies required**

#### For all research:

|                                     |                                                                                                                         |  |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--|
| <input checked="" type="checkbox"/> | Completed <i>Ethics Application Form</i>                                                                                |  |
| <input checked="" type="checkbox"/> | Copies of the research proposal                                                                                         |  |
| <input checked="" type="checkbox"/> | Copies of proposed research instruments (e.g. questionnaires/interview schedules)                                       |  |
| <input checked="" type="checkbox"/> | <i>Participant Information Sheet</i> (for each different sample group)                                                  |  |
| <input type="checkbox"/>            | <i>Consent Form</i> [ <i>Assent Form</i> for under 18s] (for participant's signature) (for each different sample group) |  |

#### Where applicable (Attach to this form):

|                          |                                                                                                                                                                  |  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <input type="checkbox"/> | Relevant permissions (from, e.g. company's HR department, National authorities such as Education, Correctional Services, etc.) or other legally required consent |  |
| <input type="checkbox"/> | Any other appropriate consent forms (e.g. consent forms for members of focus groups, consent forms (for video or photography), etc.                              |  |

|                          |                                                                     |                          |
|--------------------------|---------------------------------------------------------------------|--------------------------|
| <input type="checkbox"/> | Guardian <i>Consent Form</i> (for participants under the age of 18) | <input type="checkbox"/> |
| <input type="checkbox"/> | Other (please specify)                                              | <input type="checkbox"/> |

## Declaration

I recognise that it is my responsibility to conduct my research in an ethical manner according to Guidelines of the University of the Witwatersrand, according to any laws and/or legal frameworks that may apply, and according to the norms and expectations of my discipline.

In preparing this Application for Ethics Clearance form, I have consulted the **Guidelines for Human Research Ethics Clearance Application /non-medical** (available on this web site <http://web.wits.ac.za/Academic/Research/Applications.htm>) and have familiarised myself with the ethical guidelines specific to my discipline.

Signature

Name \_\_\_\_\_ of \_\_\_\_\_  
researcher/applicant \_\_\_\_\_

## 1. Researcher's personal data

|                                                            |                                      |                                               |                                    |
|------------------------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------|
| Surname:MATUMBA                                            |                                      | Name:FUNGAI                                   |                                    |
| Title:                                                     | <input type="checkbox"/> Prof        | <input type="checkbox"/> Dr                   | <input type="checkbox"/> Mr        |
|                                                            | <input type="checkbox"/> Ms          | <input checked="" type="checkbox"/> Mrs       | <input type="checkbox"/> Other:    |
| School:<br>PSYCHOLOGY                                      |                                      |                                               |                                    |
| Staff / Student number:                                    | 894022                               | <input checked="" type="checkbox"/> Full time | <input type="checkbox"/> Part time |
|                                                            |                                      | <input type="checkbox"/> Staff                |                                    |
| Your telephone(s):073<br>637 35 88                         |                                      |                                               |                                    |
| Your Email:titsvalo@gma<br>il.com                          |                                      |                                               |                                    |
| Name of Supervisor (if applicable):<br>GILLIAN FINCHILESCU |                                      |                                               |                                    |
| Supervisor's address:                                      | email gillian.finchilescu@wits.ac.za |                                               |                                    |
| Supervisor's number(s):                                    | tel. +27 11 717-4534                 |                                               |                                    |

## 2. Specifics about the research project

Title of research project

STRESS LEVELS AMONG STUDENTS: AN EXAMINATION OF COPING STRATEGIES AND SENSE OF COHERENCE AMONG MEDICAL AND PSYCHOLOGY STUDENTS AT THE UNIVERSITY OF WITWATERSRAND, JOHANNESBURG IN SOUTH AFRICA.

|                                                                                       |                                                                  |                                                                                              |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Is this research for degree purposes?                                                 | <input checked="" type="checkbox"/> Yes                          | <input type="checkbox"/> No                                                                  |
| If so, for what degree?                                                               | <input type="checkbox"/> Honours<br><input type="checkbox"/> PhD | <input type="checkbox"/> Masters (dissertation)<br><input type="checkbox"/> Other (specify): |
|                                                                                       |                                                                  | <input checked="" type="checkbox"/> Masters (research report)                                |
| Has it been approved by the relevant higher degrees committee or other relevant unit? | <input type="checkbox"/> Yes                                     | <input checked="" type="checkbox"/> No                                                       |
|                                                                                       |                                                                  | <input type="checkbox"/> Submitted & pending                                                 |

List the names and affiliations of any additional researchers who will be covered by this ethics protocol

N/A

Where will the research be carried out?

WITWATERSRAND UNIVERSITY

What are the aims and objectives of the research? (Please list; be brief)

- The primary objective of the study is to investigate the relationship between stress, Sense of Coherence and coping strategies amongst medical and psychology students at the University of Witwatersrand.
- To examine differences in stress levels between medical and non-medical students (psychology students in specific)

Do you have any financial or material interest associated with your research participants or with the organisations that you will work with during your research?

|                                                                                                    |                                        |                                                                    |
|----------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------|
| <input type="checkbox"/> Yes                                                                       | <input checked="" type="checkbox"/> No | <input type="checkbox"/> Potential conflicts of interest may exist |
| Please explain how you will manage any existing or potential conflicts of interest, if applicable. |                                        |                                                                    |

**INFORMATION RELATING TO ETHICAL MATTERS**

*Protocols submitted to the Committee must have sufficient information to enable the committee to judge the ethical implications of the proposed research. Please be brief and concise but also as specific and informative as possible*

**3. Formal permission**

**Has appropriate formal permission been obtained, if required (e.g. employer, government department, land owner, etc.)?**

|                          |                |                          |              |                                     |                                                         |
|--------------------------|----------------|--------------------------|--------------|-------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> | Yes (attached) | <input type="checkbox"/> | Not required | <input checked="" type="checkbox"/> | Pending (must be supplied before permission is granted) |
|--------------------------|----------------|--------------------------|--------------|-------------------------------------|---------------------------------------------------------|

Obtaining permission is necessary when conducting research *within the premises* of a particular site such as an ethnography of the functioning of a supermarket or a school, or the way staff interact with clients in a clinic, or of how the HIV Unit in the City of Johannesburg functions. Please read the detailed guidelines on the Ethics website <http://web.wits.ac.za/Academic/Research/Applications.htm>

| <b>4. How will data on human research participants be collected (instruments, methods, procedures)? (Attach instruments as an appendix)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | In written format (e.g. questionnaires, diagnostic tests, etc.)                                                                                                            |
| <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Completion of on-line instruments (e.g. questionnaires)                                                                                                                    |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Individual interviews (e.g. structured, semi-structured, etc.)                                                                                                             |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Group interviews (e.g. seminar/discussion groups, focus groups, etc.)                                                                                                      |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ethnographic observation, participant observation, other informal descriptive, and/ or interactive methods                                                                 |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Community-based methods or techniques such as drama workshops, community theatre, training workshops, participant rural appraisal (PRA), rapid rural appraisal (RRA), etc. |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Research on/in therapeutic or counselling contexts                                                                                                                         |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Observation of public performance, and/or public behaviour observation                                                                                                     |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Photography, video and/or audio recording ( <b>specific separate consent forms may be required</b> )                                                                       |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Other research methods or techniques (specify in this line).                                                                                                               |
| <p><b>Brief details of instruments to be used</b> (attach instrument or draft to this application)</p> <p><b><u>4.1 The Orientation to Life Scale (SOC)</u></b> (Antonovsky, 1987) which is mostly referred to as the Sense of Coherence Scale will be used to assess Sense of Coherence. It is a 29-item scale, in which, items on the Orientation of Life are assessed using a 7-point Likert Scale, where 1 and 7 are used to represent extreme ends of each continuum ( Feldt et al.,, 2005).The scale evaluates an individual's Sense of Coherence and has got three components which are included in the questionnaire (comprehensibility, manageability and meaningfulness). Higher scores indicate a strong Sense of Coherence.</p> <p><b><u>4.2 Stress Coping Style Inventory (Lin &amp; Chen, 2010)</u></b></p> <p>The Stress Coping Style Inventory was used to assess coping strategies. It was developed for university students and college of technology students. It is divided into four factors which are Passive Emotional Coping, Active Emotional Coping, Passive Problem Coping and Active Problem Coping. It is a 28-item scale, with items assessed using a 5-point Likert Scale, which ranges from 1 (completely disagree) to 5 (completely agree) to. The scale indicates that the higher the scores, the higher the rate of each coping style used. This Stress Coping Style Inventory has been widely used and considered as a reliable and valid measure and Cronbach coefficient for this scale is normally around 0.83 (Lin &amp; Chen, 2010).</p> <p><b><u>4.3 The Perceived Stress Scale</u></b></p> <p>The Perceived Stress Scale (PSS) measures psychological stress associated with sex, age, education, income, employment status, and a number of other demographics. The PSS showed adequate reliability and, as predicted, was correlated with life-event scores, depressive and physical symptomology, utilisation of health services, and social anxiety (Cohen, S., Kamarck, T., &amp; Mermelstein, R. (1983).</p> <p><b><u>4.4 Biographical Questionnaire</u></b></p> <p>This includes students' personal information. It includes age, gender, education level, race etc</p> |                                                                                                                                                                            |

### 5. Who will the research participants be?

Brief description of human participants, including age range and sample size, for each sample:

All medical and psychology students at the selected South African University are the target population of this research study. Second and third year medical and psychology students at selected South African University will be invited to take part in the survey and a sample of 200 students is expected to be used. Age range would be from 19 to 30 years.

Does this research expose either the participant or the researcher to any potential risks or harm that they would not otherwise be exposed to?

☒

Yes

☐

No

If 'yes', explain:

The probability or discomfort anticipated in the research are not greater than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests. However, research is going to pose low risk as factors like loss of time affect research participants since they have to dedicate time to complete the survey. Apart from that there will be undesired changes in thought processes and emotions such as stress and feelings of guilt as research participants reflect back on their past experiences.

Will research involve vulnerable categories?

☐

Yes

☒

No

If so, state which ones:

How will any existing vulnerabilities among research participants be addressed?

**NB:** The term 'vulnerable categories' includes, among others, children under 18, orphans, prisoners, persons with cognitive or communication disorders, people who are traumatised or currently in traumatic situations.

Where necessary, include details of steps to be taken to facilitate data collection across language barriers (e.g. interpretation or translation).

### 6. How will informed consent be obtained?

How will potential participants be identified / selected / recruited?

The researcher will approach the University Registrar and ask for the names and e-mail addresses of all second and third year students. Convenience sampling will be used to select the participant. E-mails will be sent to all potential participants with information sheets.

What will participants be told about the research (including the promises to be made)?

The researcher is going to explain the purpose and benefits of the research through the use of information sheets. They are also going to be told the process of the research and their duties as participants. Besides that, they are going to be told that they are free to withdraw from participating in the study at any time until they click send on the online survey.

How will informed consent be obtained?

|                          |                      |                          |                        |                                     |       |
|--------------------------|----------------------|--------------------------|------------------------|-------------------------------------|-------|
| <input type="checkbox"/> | Formal (Signed form) | <input type="checkbox"/> | Informal (e.g. verbal) | <input checked="" type="checkbox"/> | Other |
|--------------------------|----------------------|--------------------------|------------------------|-------------------------------------|-------|

Briefly explain your strategy for ensuring informed consent

Participants are going to be given information sheets which explain the purpose of the study and all the procedures involved. The information sheet is also going to state that participation is voluntary and that the participants can withdraw from participation at anytime before they click send on the survey monkey. The information sheet will also have a section where participants can indicate that they have agreed voluntarily to participate.

**Attach *Participant Information Sheets* and *Consent Forms* for each sample group, and/or other related materials**

**NB: *Consent*** in social science and humanities research involving human participants: Where informal ethnographic or participant observation methods are used, or where signed *Consent Forms* are not possible, or for research involving group contexts (focus group, Participant Rapid Assessment, Rapid Rural Appraisal, public performance, workshops) **state how the quality of informed consent will be assured**. It is essential that participants in research be fully informed and agree, on this basis, to participate in the research.

### 7. Protecting participant identities

|                                                                                      |                                     |     |                          |    |
|--------------------------------------------------------------------------------------|-------------------------------------|-----|--------------------------|----|
| Can <b>confidentiality</b> be guaranteed?                                            | <input checked="" type="checkbox"/> | Yes | <input type="checkbox"/> | No |
| Can <b>anonymity</b> be guaranteed in resulting reports, theses and/or publications? | <input checked="" type="checkbox"/> | Yes | <input type="checkbox"/> | No |

**Explain** how this will be done? (What will participants be told in this regard?)

Confidentiality and anonymity are going to be assured by the researcher. The survey does not require a participant to write his/her name, it will be anonymous, which means that there will be no identities. Codes will be used where applicable.

**NB:** While confidentiality may be desirable, it cannot be guaranteed in, for example, focus groups, or ethnographic observation. Similarly anonymity should be preserved in questionnaires, but cannot be offered in workshop methodologies, focus group research, etc. Participants should have the right to remain anonymous in the final report, and this must be respected in handling of all data relating to them. Participants need to be informed about these issues.

## 8. Protection of data during and after the research

How will the data be protected while the research is in progress? (This includes how the identities of participants will be protected).

8.1 Paper-based records must be kept in a secure location and should only be accessible to

personnel involved in the study.

8.2 Computer-based records must only be available to personnel involved in the study through the use of access privileges and passwords.

8.3 The researcher only will have access to the data and it will be retained in password protected files.

8.4 Personal Identifiers will be removed from the data

What is to be **done with the research data** after completion of the project?

|                          |                                                   |                          |                                                             |
|--------------------------|---------------------------------------------------|--------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> | Stored in archives (specify)                      | <input type="checkbox"/> | Stored in on-line data base (specify)                       |
| X                        | Stored in password protected computer             | X                        | Stored in digital form with all identifying feature removed |
| X                        | Destroyed after 5 years (insert numbers of years) |                          |                                                             |

Explain how the data will be securely stored during this time

1. Paper-based data will be retained in locked file cabinets.
2. Computer-based will be securely stored with the use of passwords

**NB:** 'Raw' or unprocessed data, especially **where the identity or personal data of research participants is included, must be safeguarded** and preserved from unauthorised access. Data may be destroyed after use, but **preservation in an**

**archive or personal collection** may also be appropriate, desirable or even essential. For instance, data sets that contain **historically important information** or information that relates to **national heritage** must be preserved and should be placed in a public archive where possible and appropriate.

All data should be preserved in a way that **respects the nature of the original participants' consent**. If you are unsure about the procedure of data management and storage, please contact Nina Lewin (nina.lewin@gmail.com)

#### 9. Access to the research results / reports

How will the results be **reported**?

This study will be written up as a research report which will be available online through the university library website and participants will be given a summary of the report upon request.

Who will have access?

Anyone who wish to have access can do so.

Note: All Wits Masters and PhDs are stored in the main library as well being made available on the www.

#### SIGNATURES (REQUIRED)

In signing this form, the researcher and supervisor (if any) of this project undertake to ensure that any amendments to this project that are required by the Human Research Ethics Committee are made before the project commences.

*Declaration: We, the signatories, declare that all information on this form is correct and that we will strive to maintain the highest ethical standards in this research at all times, according to disciplinary and university expectations, recognising that ethical practice in research is always a continuing process.*

|                   | Date | Name | Signature |
|-------------------|------|------|-----------|
| <b>Applicant</b>  |      |      |           |
| <b>Supervisor</b> |      |      |           |

# Appendix G: Ethics Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (SCHOOL OF HUMAN & COMMUNITY DEVELOPMENT)

CLEARANCE CERTIFICATE

PROTOCOL NUMBER: MASPR/18/004

PROJECT TITLE:

Stress levels among students: an examination of sense of coherence and coping strategies among medical and psychology students at the University of Witwatersrand, Johannesburg in South Africa

INVESTIGATORS

Matumba Fungai

DEPARTMENT

Psychology

DATE CONSIDERED

19/07/18

DECISION OF COMMITTEE\*

Approved

is ethical clearance is valid for 2 years and may be renewed upon application

DATE: 19 July 2018

CHAIRPERSON

  
(Prof. Gillian Finchilescu)

Supervisor:

Prof. Gillian Finchilescu  
Psychology

DECLARATION OF INVESTIGATOR (S)

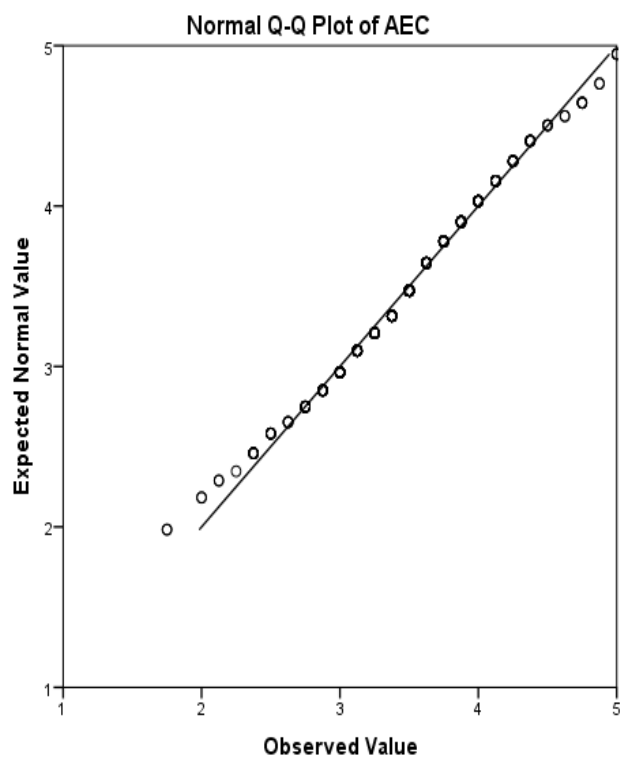
**Appendix H: Normal Q-Q Plots**

Figure 9: Normal Q-Q Plot for Active Emotional Coping

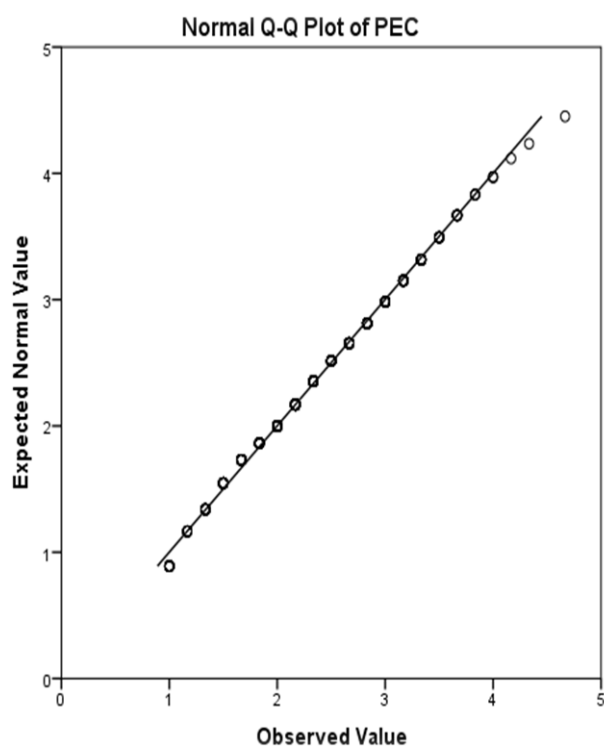


Figure 10: Normal Q-Q Plot for Passive Emotional Coping

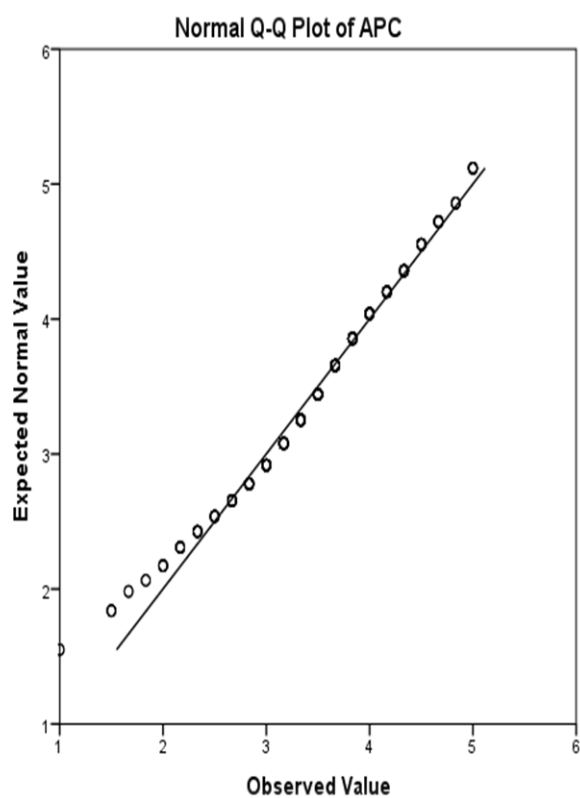


Figure 11: Normal Q-Q Plot for Active Problem Coping

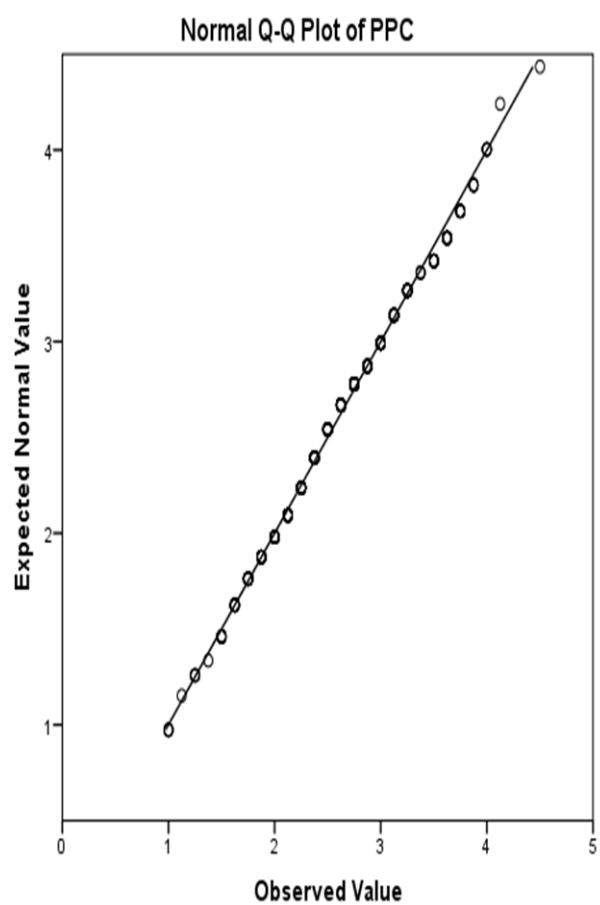


Figure 12: Normal Q-Q Plot for Passive Problem Coping